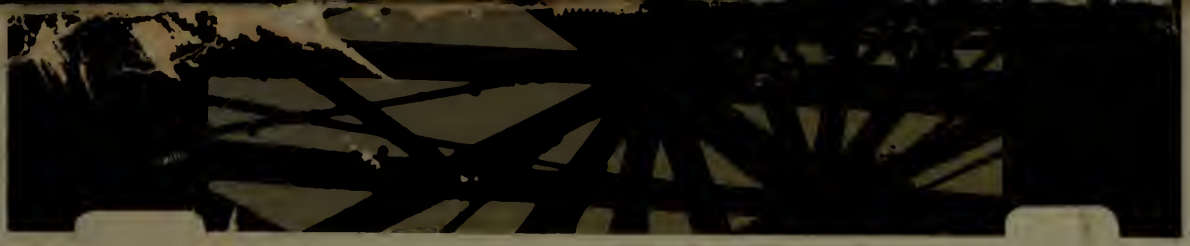
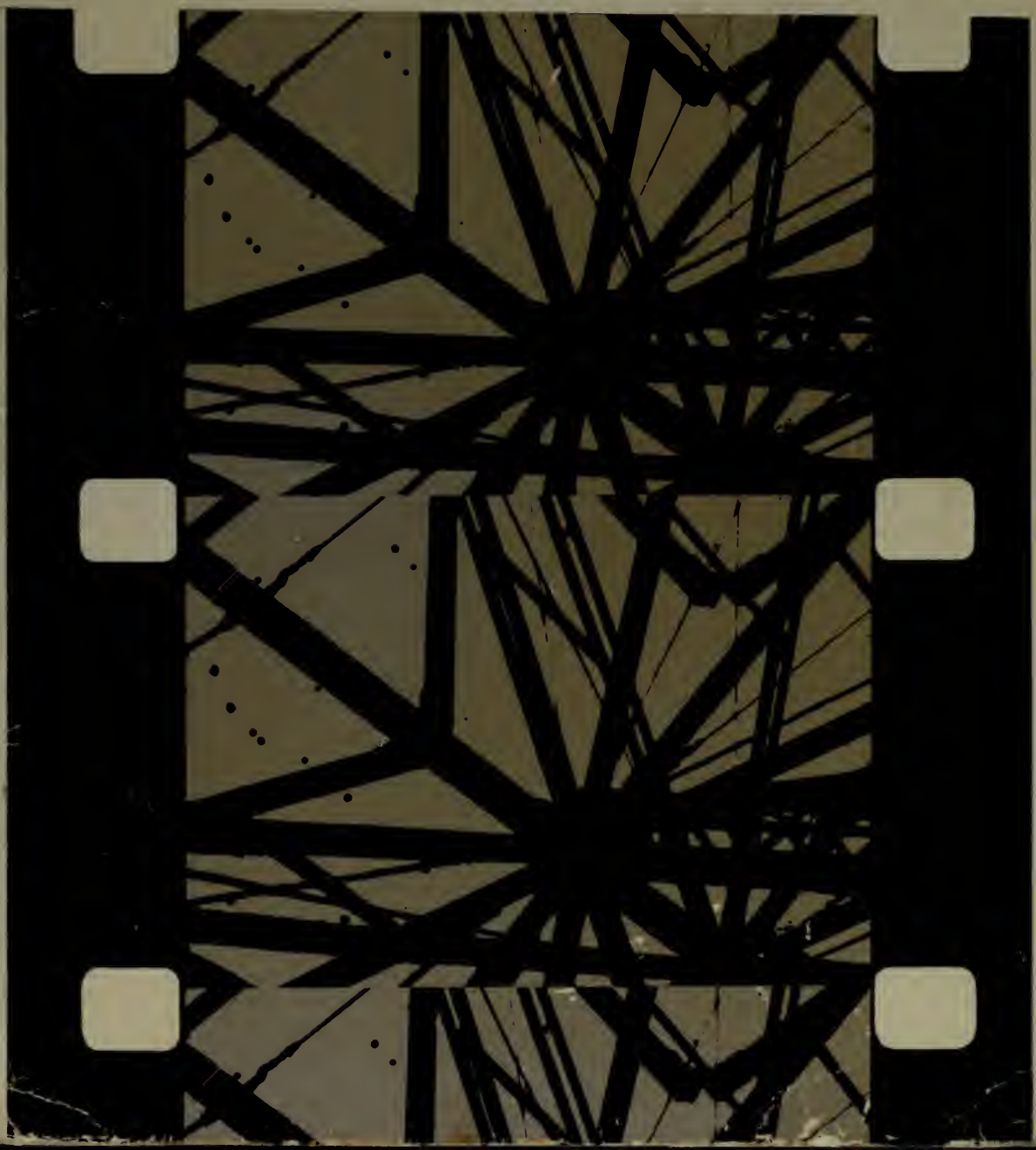


Film Editing Handbook

Technique of 16mm Film Cutting

Churchill



Film Editing Handbook
Technique of 16mm Film Cutting

2—

Film Editing Handbook
Technique of 16mm Film Cutting

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Preface

Film Editing Handbook is designed to help the film student with the complexities of film cutting. It catalogs the mechanical procedures of picture and sound cutting and supplies step-by-step explanations of these procedures. I have selected those particular cutting procedures that have, traditionally, been stumbling blocks to film students.

The student should consider this handbook as a guide. He may, after cutting several films, evolve short-cuts for specific cutting procedures—and in so doing build his own system, guided by the accepted standards of the motion picture laboratory. The techniques outlined in this work are, for the most part, based on the use of standard, easily obtained equipment (for suggestions about the acquisition of editing equipment, see Appendix B).

A few words about the structure of this handbook. Notice that it is divided into two parts: *A. Picture Cutting* and *B. Sound Cutting*. It has been arranged this way to guide the filmmaker, first, in cutting silent footage. A basic understanding of the handling of visuals will give the novice filmmaker the confidence he may need to cut the sound track. However, since picture and sound quite often are cut simultaneously, the reader should familiarize himself with the entire book before starting to cut his film.

This handbook is designed to be used while working at the cutting bench. It is here that the filmmaker discovers the cutting problems in his film. In this book the problems are divided into sections, followed by the steps to be taken for their solution. There is also a glossary of terms used in film cutting and film in general at the end of the book (items appearing in the glossary are often boldfaced in the text). Obviously, correct use of terminology is important, especially in correspondence with the laboratory. Before getting involved in the body of this handbook, the reader should study the glossary and become somewhat familiar with film terms. In addition, there is an appendix of sample forms and charts discussed and utilized in the handbook; an appendix on editing equipment and tools; and a bibliography of books on editing.

In the realm of acknowledgments, I want to express my profound gratitude to the following: John L. Fell, Professor of Film, for the encouragement given me when I first proposed this project; Jameson C. Goldner, Assistant Professor of Film, for his meaningful direction; David Hilberman, Associate Professor of Film, for his careful attention to proofreading. These people, and all my colleagues in the Film Department, School of Creative Arts, San Francisco State College, have helped me to make this a better work. I also want to thank these reviewers of the manuscript: Peter Dart, University of Kansas, and Hugh Grauel, University of California at Los Angeles. Their helpful suggestions and constructive criticisms proved most beneficial.

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H.B.C.

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Part A. Picture Cutting

There are two sides to film editing: the creative and the physical. Creative film editing is a selective process by which the filmmaker manipulates the various visual and aural elements of the film footage (for example, dynamic and static composition, color, pacing, patterns, sound, etc.) to refine his film statement and its effect on an audience. Physical editing, on the other hand, is simply the cutting of film—that is, the mechanical steps involved in handling the film and the editing tools.

We are concerned here, and in the remainder of this handbook, with the mechanical steps of film editing, or physical editing; for no matter how creatively one may edit film, he must first cut it physically so that it complies with present-day laboratory standards and so that it can be printed with the creative effects he has planned. In short, only if you approach film editing with a full understanding of the standard procedures for the physical cutting of film will you have the necessary springboard to successful creative editing.

An important element to all film editing is the film laboratory; for unless you have a thorough knowledge of the services and procedures of the laboratory, you will inevitably sacrifice time, money, quality, and the creative effects you want.

The following material is an overview of the standard laboratory services and procedures in handling 16mm film.* Specifically, we will discuss the developing of the camera-original film and the daily printing, first answer printing, and reversal and positive release printing processes. In addition to becoming familiar with this information, you should also, of course, thoroughly discuss your particular project and needs with the lab personnel.

Development of the Camera-Original Film. Developing the camera-original film into a reversal or negative image is the first stage of what is often termed by the laboratory as front-end work. When the reversal camera-original film is developed, it shows, as nearly as possible, the colors or the gray scale of the subject matter that was photographed. Whereas, after development, the negative camera-original film shows the colors or gray scale as complementary to the subject matter photographed. This development process, be it negative or reversal, is carried out under highly controlled conditions. Various photographic and chemical tests are regularly made by the lab to assure standard and consistent development according to the specifications of the film's manufacturer. Development is the other half of exposure technique. If your camera-original film is consistently over- or underexposed, consult your lab personnel.

*This material is drawn from the article "Laboratory Services in 16mm Production," in *Rewind*, Vol. 11, July-August 1969. By permission of the publisher, DeLuxe General, Inc., Hollywood, Calif.

Your camera-original film (termed *footage*, after development) is very valuable to you. It represents, at this point, the total investment of money and hard work you have put into your film. This footage is also important as a standard of comparison for the prints to be made from it. These prints will be only as good as the original—any scratches or imperfections will be transferred (to some degree) to all succeeding prints. Do not project the camera-original footage since you could damage it. It is not even advisable to run the original footage through a hand viewer. Instead a copy called **dailies**, or **rushes**, is printed from it. The camera-original footage is stored to keep it free from damage, and the daily or rush print is used as a **cutting copy**.

Daily Printing. The printing of dailies (also known as rushes or, when assembled, as a **workprint**) is the second stage of the front-end work. The filmmaker has a number of options in ordering his dailies from the lab. They may be either color or black and white from his color original footage. They may be **one-light** (all scenes in a roll printed on the same printer light) or **timed** (each scene printed to correct undesirable variations in exposure density or color). They may be **latent-image key numbered** (exposing the latent-image serial numbers from the original footage through the daily print) and/or **ink-printed footage numbered** (with progressive, identically spaced numbers placed on both the original footage and the daily print by the lab).

The usual plan is to order a one-light, latent-image key numbered *and* ink-printed footage numbered daily print. Also, a color daily print is usually ordered from color original footage. A one-light print is preferred because it is lower in cost (since less labor is involved) and, more importantly, because the one-light print is a true report of the variations of the original film's exposure. Most filmmakers also prefer to have both latent-image key numbers and ink-printed footage numbers because the key numbers in combination with the ink-printed numbers provide an easier identification of short scenes. Ink-printed footage numbers also provide greater numbering flexibility. For example, each new roll of film for a production may pick up with footage numbers in sequence from the preceding roll. Prefix letters can also be used to clearly separate film rolls from different productions. When you have your original footage printed—be certain to instruct the lab to print *full aperture* (the sound track image area mask is removed), so that the latent-image key numbers can be printed through to the daily print. A color print from color-original footage is preferred to black and white because some defects in the original exposure (edge-flares, for instance) may not show up clearly in a black-and-white daily print. Therefore, color quality in the camera-original footage cannot be accurately evaluated by viewing a noncolor daily print.

The First Answer Print. After the workprint has been edited and the camera-original film rolls are prepared (see Conforming Original to Workprint, Section A-10), the laboratory makes the first **answer print** (an approval print, a pilot print, etc.). For the filmmaker, the first answer print serves as a check of the editing, **conformation** of the original film, placement of the **optical effects**, sound **synchronization**, and all other factors over which he has exercised creative control. For the lab, the print provides a check of scene-to-scene color and density correction, overall synchronization between picture and sound, and the correct rendition of any special effects that may have been made on the printer such as **dissolves**, **double exposures**, **fades**, etc. (For further discussion of the first answer print, see Section B-13, page 127.)

Reversal and Positive Release Printing. If only a few copies of the release print of the completed film are needed, reversal release prints may be ordered. These are made directly from the edited camera-original rolls. However, if ten or more release prints are required, it is more economical to order an **internegative** (**dupe negative**, or fine grain) from which a number of positive release prints can be made. The total cost of the internegative and the ten positive release prints is about the same as ten reversal release prints, but the cost of positive prints after that may be as little as half the cost of the reversal release prints.

After making the internegative, the laboratory makes a first positive print from the internegative for customer approval. By projecting this first positive print, you can determine whether the internegative itself is acceptable and can also check on image density and the sound track.

1. Splicing Film

Purpose

To discuss the most common types of splices and their uses; and to provide a procedure for making and testing an overlap-cement splice.

The splicers in common use today can be divided into four types, all of which are available in several different models: the overlap-cement, the butt-heat-weld, the pressure-sensitive perforated tape or Presstape, and the guillotine-tape.

A certain amount of manual dexterity is needed in order to operate many of the tape **splicers.** You should therefore practice on scrap film before you attempt to splice important footage.

The main feature to look for in a good splicer, no matter what type you choose, is that it will make well-aligned, strong and clean splices, and that it will keep making them after long and continual use. Film running through a printer or projector undergoes tremendous strain and weak splices will soon part. There is nothing more frustrating to the filmmaker (or his audience) than to be forced to stop and resplice film during a screening. Therefore, your workprint splices must be strong and smooth in order to withstand repeated screenings.

Strong, clean, smooth splices are also a must for film that is to be sent to the laboratory. The lab may charge extra if one of your splices breaks during a printing run. And besides the expense, a break in one or more splices can mean considerable delay since, as a rule, labs will not replace parted splices—not because they don't want to but because of the possibility of lost frames that could throw the film out of sync. The lab will inform you of any parted splices in your camera-original printing rolls. The usual practice is that you will have to go to the lab and resplice the rolls.

The Overlap-Cement Splice

This splice requires that the end of one film piece overlap the end of another film piece. In order to splice (or join) these pieces together, the emulsion must be scraped off along the overlapping area of one piece, the surfaces softened with cement, and the two

pieces of film clamped firmly together. The two film pieces spliced in this manner are actually welded together—the film cement causes one film base to weld into the other film base.

The most commonly used widths for the overlap splice are 1/16th of an inch for negative or camera-original film, and 1/10th of an inch for positive or workprint film.

The type of overlap splicer that uses heat applied to the splice area—called a hot splicer—is preferred by many film editors because of the shorter lock-down time, and a stronger resultant splice (see Figure A-1).

Advantages. Overlap-cement splices are strong, clean, and relatively fast. This type of splice is especially recommended for splicing camera-original film rolls for printing, since the resulting splice, when well made, is optically clean.

Disadvantages. Usually one frame on the tail of a scene is cut off by the overlap-cement splice. Also, image distortion will result if the cement is allowed to run into the picture area. Thus, the splicer must be clean and in alignment, and special care must be taken not to leave emulsion scrapings or other foreign matter on the splice.

The Heat-Butt-Weld Splice

This splice is not overlapped. Instead, the splicer cuts the film along the frame-line and joins the two pieces together by welding a thin ribbon of polyester tape (.016 of an inch wide) along the joint. This welded splice is strong, but not as strong as the well-made overlap-cement splice. However, the butt-heat-weld splice is one of the two methods used in joining two dissimilar film bases; the other method is the tape splice.

Advantages. No emulsion scraping and no application of cement is necessary with this method. Also, there is no frame loss, and film thickness is not increased. This type of splice produces a very quick and uniformly clean joint.

Disadvantages. There are none really, except the price, which is rather high—$600 and up, as compared to $20 and up for the overlap-cement splicer.

The Pressure-Sensitive Perforated Tape

This type of splice repairs or joins all types of film by mechanically applying a clear mylar tape, coated on one side with a pressure-sen-

sitive adhesive. This tape is also perforated to match the film to be spliced. With Presstapes (a brand name of the Eastman Kodak Company), you may use any frame-line splicer that will register the film accurately, and the result will be a quick, strong splice. These tape splices are generally used for repair of positive film or for assembly of a workprint. An excellent combination for workprint and positive film splicing is an inexpensive frame-line splicer and Eastman Kodak Presstapes. This equipment can usually be used for 8mm and 16mm films, and the tapes are available in both widths.

Advantages. This splicer makes a frame-line splice with no lost frames. Tapes are quickly and easily applied and are strong yet may be taken apart. This type of splice is ideal for workprint assemblage and sound track splicing. It is also excellent for reinforcing torn sprocket holes in workprints.

Disadvantages. Presstape and other perforated tapes are more expensive per splice than the overlap-cement type. Also, the frame-line cut prohibits later resplicing by overlap cement. This type of splice should not be used for film to be printed because the tape will show on the screen.

The Guillotine-Tape Splice

The guillotine splicer uses mylar tape to make butt-type straight or diagonal splices. The splices can be made without losing frames and dissimilar base films can be joined. The film to be spliced is laid on the register pins in the recessed splicing block; then the mylar tape, positioned at a right angle to the film, is pulled out and across the open splice. With two quick strokes of the guillotine handle, the applied tape is perforated and cut to conform to the film. The model of guillotine splicer that makes both straight and diagonal cuts (straight for the picture, diagonal for sound film) is the best combination to buy.

Advantages. Same as previous type of tape splicer, except it is cheaper per splice.

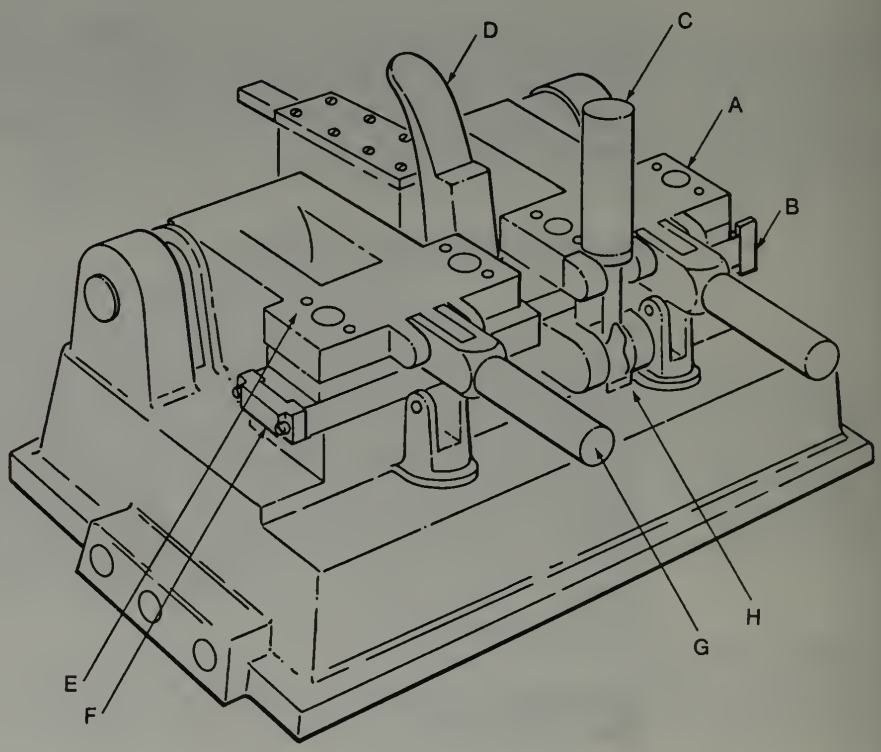
Disadvantages. This splicer should not be used for film to be printed. It sometimes does not cut a good sprocket hole, which causes the film to "lose the loop" in the projector. In this respect, the splicer must be kept clean and free from accumulated tape. The splicer should be cleaned every 25–30 splices. The guillotine splicer is on the expensive side—about $160.

To explain the operation of the many different models and brands of splicers would be beyond the scope of this handbook. Instead,

we will discuss the use of the overlap-cement splicer, which is used mainly in splicing original film **A&B rolls** for printing—the type of splicing that requires the greatest care, technique, and cleanliness (see Section A-10). This type of splicer is also used for making permanent repairs on projection prints and by some television film cutters to roll up several commercial spots onto the same roll. (Recommended methods of operation for the other types of splicers can be found in the instruction manuals provided by the manufacturers.)

How to Make an Overlap-Cement Splice

The many different brands of overlap splicers all require the same basic techniques: (1) the film must be aligned across the splice



A Right channel
B Right anvil
C Right-channel locking lever
D Scrapper blade
E Left channel
F Left anvil
G Left-channel locking lever
H Heating element in base, under anvils

Figure A-1. Overlap-Cement Hot Splicer

and between the sprocket holes; (2) the scraped area must be clean of emulsion and not larger than the overlapped area; (3) the cut-off and trim must be square with each end; (4) the splice pressure must be even and firm (but not heavy) over the entire splice area; and (5) the cement used must be fresh and of the proper formula for the film base being spliced (check the film-stock manufacturer's recommendation).

Step 1 Load the tail of the first film piece, emulsion up, onto the right side of the splicer. Lock the right film channel and lift the entire assembly up and out of the way.

Step 2 You may want to trim off the excess of the right film piece before the next step. However, in most cases, the trim will be made automatically when the right channel assembly is lowered for the splice.

Step 3 Load the head of the second film piece onto the left side of the splicer, with the film emulsion up. Leave one or two excess frames hanging over the left anvil. Register the film on the pins and lock the film in place by lowering the left film channel and fastening the left film channel locking lever. (Some hot splicers may have only one registration pin to a side, so you must make certain that the film is straight in the channel).

Step 4 Do not trim off the excess frames on the head of the second film piece—bend them down and out of the way. Carefully scrape off all the emulsion of the left film piece. Any emulsion left will produce a faulty splice. Put a "tooth" or slight abrasion on the exposed base.

Step 5 The application of cement (fresh and the proper type for the film base) should be done quickly and cleanly. The speed and neatness is very important; there should be no wasted time or motion in locking down the right side of the splicer after the cement has been applied. Replace the cap on the cement bottle. Cement evaporates rapidly and loses its effectiveness.

Step 6 Follow the splicer manufacturer's recommendations as to the length of "lock-down" for a good splice. Hot splicers, which hasten the drying of the film joint, are, of course, faster than cold splicers. Under normal circumstances, you should keep the splicer lock-down time for at least 7 seconds. This length of time gives the cement a chance to thoroughly weld the bases of the two film pieces.

Step 7 Open the splicer and wipe off the excess cement with a clean, lintless cloth or a white glove.

Step 8 Test your splice by holding the joint so that it faces you and gently twisting the left and right sides of the splice in opposite directions. Use about a 90° twist, and test it three or four times. A strong

splice will survive. You may also test the slice by holding the film so that the splice is at the top of a film loop. If the film bends sharply at the splice, the splice is too weak. This weakness is caused by too much scraping on the left film piece. Finally, you should hold the film up to the light. The splice is good if there is no visible line between the two film pieces. If there is a visible line at the splice, check the scraping blade on your splicer; it is scraping too wide an area. This visible line will print through to the answer print, causing a small flash on the screen every time it passes through the projector gate. Careful application of blooping ink over the line will keep it from printing through.

2. Using the Gang Synchronizer

Purpose

To explain the use of the gang synchronizer and its place in the cutting scheme.

The gang **synchronizer** is a precision film-cutting tool that measures film frames and footage and synchronizes picture and sound. It is an essential tool for conformation of camera-original footage to the workprint.

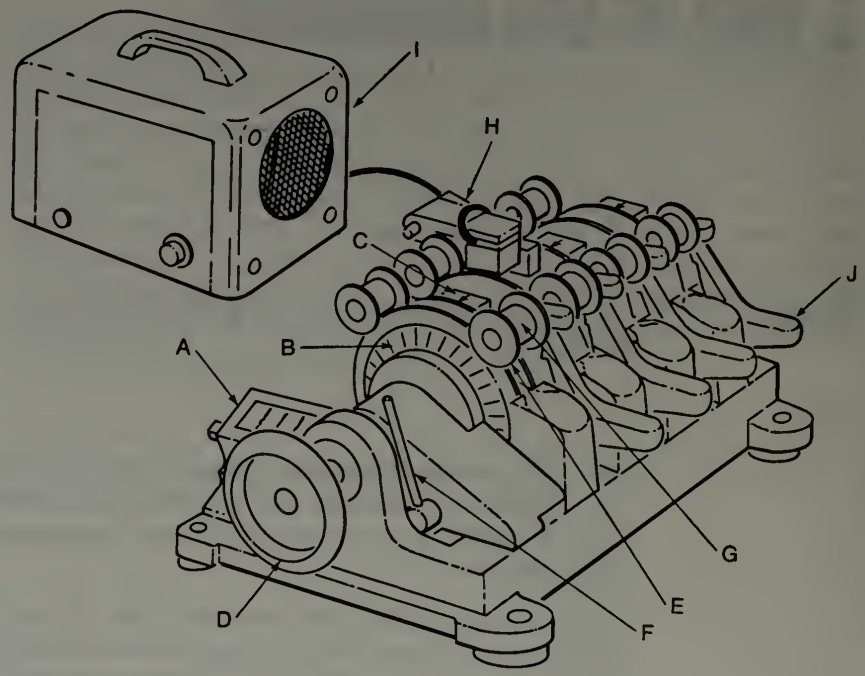
Gang synchronizers are manufactured in combinations of two, three, four, or more gangs, or sprocketed wheels (see Figure A-2). The four-gang (or more) model is recommended because it allows you to mount the workprint, the A&B rolls, and the sound track in editorial **sync**, a very necessary arrangement when **conforming** the camera-original footage to the edited workprint.

The various synchronizer models are available with sprockets either toward or away from the operator. For conformation of camera-original footage, and for all the procedures in this book, a synchronizer with sprockets away from the operator is recommended, since it allows single perforated camera-original footage to be mounted emulsion up and heads to the right—the standard position. This model will also be compatible with film viewers that read the picture from left to right and sound readers (or pick-up heads) that require an emulsion-up position.

There are also synchronizers with one or more gang combinations arranged with sprockets toward the operator. Such an arrangement allows the filmmaker to run magnetic film through sound readers that require a base-up position. Finally, the gang synchronizer can be equipped with a magnetic or optical sound-reading head and amplifier. This combination becomes very handy when spotting and syncing sound and picture. (See Appendix B, page 163, for a discussion of editing tools.)

As one of the most important tools on the editing bench, the gang synchronizer (or any piece of editing equipment) should be kept clean and in alignment at all times.

If you are in doubt about the need for or the design of a synchronizer, seek the advice of your lab. They know—they work with these tools every day.



A Footage counter
B Frame-counter dial
C Index arrow
D Rolling knob
E Sprocketed wheels (1, 2, 3, 4)
F Wheel lock
G Roller guides
H Magnetic (or optical) sound pickup head
I Sound amplifier
J Roller-guide release

Figure A-2. Gang Synchronizer with Magnetic Sound Head and Amplifier

Some Dos and Don'ts in Using the Gang Synchronizer

NOTE. *It is advisable that you have a gang synchronizer and at least 10 feet of scrap film before you as you read through the following points.*

1 Before removing picture and sound track (or any other piece of sync'd film) from the synchronizer, mark each piece in corresponding frames with the footage-edge numbers (or **code numbers**) from the workprint, in editorial **sync** (edit-sync). This will allow you to return the film to edit-sync without going back to the head-leader sync points. Or, in some cases, this edge-number mark may be your only sync point.

2 The footage counter can be reset to zero at any time without moving the film. However, the counter cannot be set to any specific footage without running the synchronizer up to that footage. The footage counter usually reads up to four digits (9,999 feet). Some, however, read only 3 digits (999 feet). The three-digit model is not a disadvantage—it simply means that the count starts over at 1,000 feet. A synchronizer with sprockets away from the operator, designed for film traveling from left to right, counts up frames and footage when the film is rolled to the right.

3 The frame-counter dial is divided into 40 spaces (frames), beginning at frame 1 and ending at frame 0 (the 40th frame). One revolution of this dial measures one foot of 16mm film. This dial, mounted on the first sprocketed gang, can be reset by holding the rolling knob (see Figure A-2) and twisting the counter dial left or right.

CAUTION. *If you reset the frame counter dial during a footage count, you will disturb the ratio between these two counters, resulting in an inaccurate footage/frame count.*

4 To measure frames or footage from the head of a film piece to its tail (or forward), place the first frame to be counted on the synchronizer at the index arrow, and set the frame counter to frame 1. This will keep each frame in its proper numerical order. In addition, set the footage counter to zero. This will record one foot for each complete revolution of the frame counter dial.

5 To measure frames or footage from the tail of a piece of film to its head (or backward), set the frame to the immediate left of the first frame to be counted on the synchronizer at the index arrow. Set both the frame and footage counter to zero. Whatever your frame count is, subtract that from 40; and whatever your footage count is, subtract that from 10,000 (if it counts to 9,999), or 1,000 (if it counts to 999). For instance, you want to measure 7 feet, 28 frames from the first picture frame of your workprint into the head of the leader to establish a sync point. Set up the film and the counters as above, move the film to the left (into the head) until the footage counter reads 9,993 (or 993), and the frame counter dial reads 12 (10,000 minus 7 = 9,993, 40 minus 28 = 12). Lock the synchronizer and mark the frame. You will notice that setting the frame to the immediate left of the first frame to be counted at frame zero on the frame counter dial is the same as placing the first frame to be counted at frame 39 on the counter dial. It can be done either way, but when measuring to heads (especially for leader), it is easier to set up the film and counters as in the first method. It gives you a known reference frame.

6 Lock the synchronizer *after* measuring footage or *before* marking a frame or making a splice. This will keep the film from drifting off the count.

7 When marking frames for a splice in the workprint, mark both the frame itself and the frame-line; the left frame-line on the tail frame of the scene, and the right frame-line on the head of the scene (see also T-markings, page 39, and Section A-8, Breaking Down Original for Conformation.)

8 Splice on the left side of the synchronizer, because the sync relationship between the two or more film pieces begins at the synchronizer and all film pieces to the right of the synchronizer are in sync. This relationship should not be disturbed.

9 The gang synchronizer can be used to *code* your picture and sound rolls or any other combination of film pieces. (See Step 1, Section B-5, page 84.)

10 The synchronizer can also be used to measure the length of a film piece for an effect. (For a chart to convert frames and feet into time, see Timing Chart, page 157.)

11 Do not attempt to do major repairs on a synchronizer. Send it to a qualified repairman or to the factory.

12 Follow the manufacturer's recommended alignment instructions. Keep the roller guides running free.

13 Do not slam the roller guide shut.

14 Do not stop a running synchronizer by using the locking lever. Slow it down by applying pressure to the rolling knob.

15 Do not attempt to move the synchronizer gangs while the locking lever is on.

3. Preparing Original for Daily Printing

Purpose To provide a procedure that will assure the proper daily printing of the camera-original footage.

Form Camera Log.

Step 1 During film production, all scenes, shot numbers, and take numbers are recorded on the Camera Log (see Figure A-3), along with footage and exposures. Note the quality of each take and circle the takes you consider best. Any changes in the script during the shooting should also be recorded on the Camera Log. Use as many cards as necessary to record this information for each roll of film. These cards should be filed with the script; they should not accompany the camera-original film when it is sent to the lab for processing. Instead, the magazine or roll number representing that film should be written on the film can.

Step 2 Handle the camera-original footage carefully. Use clean, lintless gloves, and keep the footage free from dirt or scratches. Wipe off the editing table and spread clean wrapping paper or paper towels along the table between the rewinds.

Step 3 At this point, you should consider culling and cutting out takes that you know you will not use. By doing this now, you can save money on daily printing costs. Roll up these unwanted takes and store them in a clean film can, labeling the can as to its contents. You may need these **outs**, or out-takes, later (see also Step 3, Section A-4, regarding pre-cut procedures).

Step 4 Using split reels, carefully mount the camera-original footage onto film cores. Do not mount more than 1,200 feet on a reel. There are generally 10 feet or more of fogged safety-leader on heads and tails of each roll. Since each foot of film printed costs 6 to 7 cents, you should cut off the excess leader from all but the first and last rolls. Leave 12 feet of leader (using the fogged leader portion of the roll) on the heads of the first roll and 10 feet of leader on the tails of the last roll. Also, leave several frames of **slate** or I.D. number (scene or shot number), and mark the roll number on the head of each roll. Use a frame of clear leader to mark the roll number,

Name Joe Call
Address 123 Jones St.
Midtown, Ca. 90000
Phone 689-4215

Production No. 4-26-82
Date 1/15/72 Time Morn.
Location Fisherman's Wharf
Cameraman Bob B.
Remarks Mag #1 - noisy

Scene	Shot	Take	FTG	FTC	Re	Scene	Shot	Take	FTG	FTC	Re
Int.	1	1	10	120	N.G.						
"	1	2	11	120	G.						
Ext	6	1	25	130	N.G.						
Ext	6	2	26	130	G.-?						
Ext	6	3	26+	130	G						
Ext	24	1	15	160	N.G.						
Ext	24	2	16	160	G.						

Magazine No. 1 Camera: NPR Film Type: ECO

FTG = Footage for That Shot
FTC = Exposure in Foot Candles
Re = Remarks (Good, No Good or Print)

Figure A-3. Camera Log

and write it large so that it can be seen easily and clearly. Splice each roll in the order in which it was shot (roll 1, 2, 3, etc.). Take the utmost care in making these splices.

Splicing your camera-original footage in the above manner will save you money now and time later on. It keeps the footage together and in an easily found order.

Step 5

Punch and mark the head leader of the first roll and the tail leader of the last roll on the emulsion side, as illustrated in Figure A-4.

The purpose of the head and tail punches is to give the lab reference marks to sync the camera-original footage with the workprint when you have edge-numbers ink-printed. If you don't plan on ink-printing edge-numbers, the punches are not necessary. However, you still should mark the head and tail titles. You must be certain to instruct

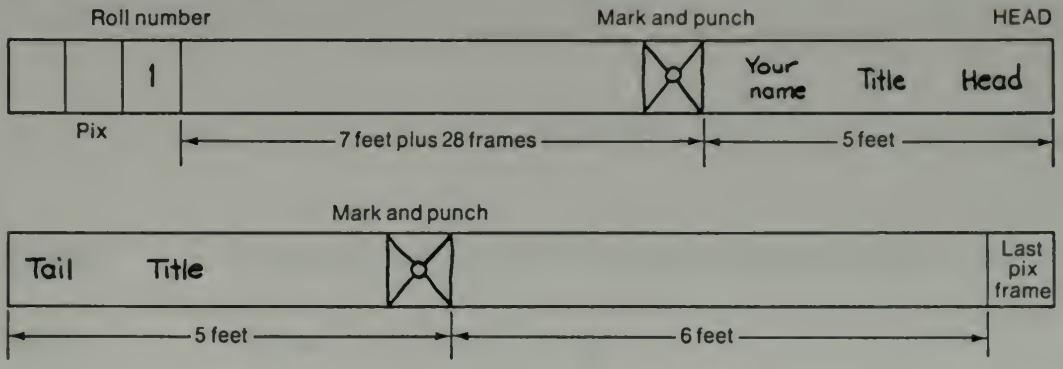


Figure A-4. Leader Punches and Markings

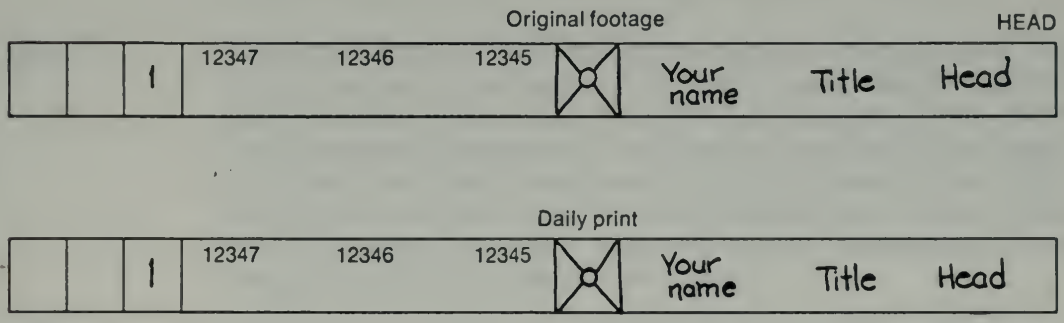


Figure A-5. Original Footage and Daily Print

your lab to print through the key numbers from your original film by specifying "full aperture" on your order sheet (see Laboratory Printing Instructions, Section B-12, page 122).

4. Organizing Original Footage for Cutting Workprint

Purpose To assure proper filing of the camera-original footage.

Forms Camera Log and Cutting Log.

Step 1 When the camera-original footage is returned from the lab, the Camera Log should be taped to the lid of the can used for the storage of this footage. If more than one roll of film is stored in the same can, tape all the appropriate cards to that can.

Step 2 Fill out the Shot/Take column of the Cutting Log (see Figure A-6) with all the shots and takes in script continuity; that is, from the **script**, not from the dailies. This is done in order to provide assurance that all shots required by the script are included in the Cutting Log. (Use it as a diary to account for all things done in the cutting stage; write your ideas down before you forget them. It also serves as a convenient catalog of shots and scenes, allowing you to go through the editorial process on paper.)

Step 3 If you plan on culling or pre-cutting the camera-original footage before printing the dailies (see Step 3, Section A-3), you should first fill out the Shot/Take column of the Cutting Log with all the Shot/Take numbers as in Step 2 above. Then scratch out those takes or shots that you eliminate. You are reminded, again, to store the original out-takes in cans and label them with their appropriate numbers on the outside of the can. You may want to use these takes later on.

Step 4 Your next step will be to eliminate the unwanted takes from the Cutting Log in order to develop a workprint cutting plan or script. The only certain method of checking takes is to *project the workprint* (not the original). The Camera Log and the Cutting Log should be checked during projection so that you can compare the takes as they play on the screen with the takes you have circled on the Camera Log. You should then be able to select the takes you want. The **out-takes** are scratched out in the Shot/Take column, and you are left with a sequential workprint cutting script.

CUTTING LOG Production No. 4-26-82 Date 1/20/72

Title Up and Down Cutter Joe Call Footage 272

Edge No. Head	Edge No. Tail	Footage/Frame Head to Tail	Shot Size	Action Direction	Shot/ Take	Scene Description
					~~1/1 ①~~	
					1/2 ① ✓	
					~~6/1 ①~~	
					~~6/2 ①~~	
					6/3 ① ✓	
					~~24/1 ①~~	
					24/1 ① ✓	

Figure A-6. Cutting Log

Step 5 To eliminate excessive physical handling of the original film during conformation, record the roll number with the shot and take numbers as you cut the workprint. This can be done by noting the roll number and circling it in the Shot/Take column of the Cutting Log. (See Figure A-6.)

Step 6 Assembly of the workprint is started by joining the desired takes in screen order. This assembly of the rough cut, and the procedures for making the final cut of the workprint will be taken up in Section A-6, Cutting the Workprint.

Step 7 After final approval of the fine-cut workprint, you should now fill in the first and second columns of the Cutting Log; that is, "Edge-Numbers Head and Tail" and "Footage/Frame Head to Tail." This procedure is outlined in Section A-7. When the Cutting Log is completed, you will have a cross reference between footage edge numbers of shots, shot length and time, and shots/takes and roll numbers and where these numbers are filed. With these facts at hand, you should have no trouble in locating any shot quickly, and with the least amount of handling of the original footage.

5. Cataloging Unidentified Footage

Purpose To provide a cutting script for footage not identified by slate or shot/take numbers.

Forms Cutting Log and Direction Symbols.

Step 1 If you are cutting camera-original film (for example, news film) or a workprint that has not been identified by shot/take numbers, you can, by using the last four columns on the Cutting Log, construct a script form to identify loose footage. A helpful guide is the chart of *Direction Symbols*, page 153.

Step 2 You start the cataloging (or **breakdown**) by viewing the film or workprint from head to tail, and filling out the appropriate columns on the Cutting Log (see Figure A-7). Use sequential numbering for the Shot/Take column, since the film continuity has not yet been established.

NOTE. *Even in the case of news film, try to avoid projecting original film. There is no safe method of projecting original footage.*

Step 3 Write the shot/take number on the head of each scene, using a rapidograph or a waterproof felt-tip pen (see page 170) or on a self-sticking "Kum Kleen" label attached to a head frame. The labels are strongly recommended; any pen or pencil will mark on them, and they are easily applied and taken off. You can make the mark in the **flash frame** (which is located at the tail of the previous shot) or in any unused frame. It is essential to mark the head of the scene so that a number will be associated with that scene. It is also important to be neat.

Step 4 After you have viewed all the shots and carefully recorded the information on the Cutting Log, you can begin to construct a script, or you can use the shot list as your script. Either method should be followed before cutting and rearranging the shots for your story so that all of the shots will be identified and recorded.

Step 5 Using your built script, proceed to edit your film; then, after the final cut has been made, fill out a new Cutting Log, arranging the

shot/take numbers into the edited sequence. With this new shot list, you can readily move on to sound cutting or A&B roll conformation.

CUTTING LOG Production No. 67-71-426 Date 2/10/72

Title Up and Down Cutter Joe Call Footage 272

Edge No. Head	Edge No. Tail	Footage/Frame Head to Tail	Shot Size	Action Direction	Shot/ Take	Scene Description
			MS	S↗	1/1	Boy enters door
			MS	"	1/2	" " "
			LS	<S	2/1	Shot of house x street
			MS		3/1	Boy gets off bike
			MS	S↗	4/1	Boy walks up to house
			CU	S>	5/1	Shot: boy's muddy feet
			MCU	S>	6/1	Shot: bike on sidewalk
			LS	↑S	7/1	Boy rides bike on sidewalk
			MS	<S	8/1	Mother calling from door

Figure A-7. Shot Cataloging on the Cutting Log

6. Cutting the Workprint

Purpose To provide procedures for assembly and cutting of the daily prints into the workprint.

Forms Camera Log and Cutting Log.

Step 1 It is wise to project all printed takes several times. This repetition not only familiarizes you with the takes, but also allows you to check usable parts of the possible out-takes. During these screenings, as we have noted, you compare the various takes with your notes on the Camera Log and compile on the Cutting Log a working plan or script for cutting the workprint.

Step 2 Before starting to assemble a rough-cut workprint, you should prepare working leaders. The ideal length for the workprint head leader is 13 feet. Use black or white leader stock (a savings can be made if you have enough waste leader left over from the processing of the original film). You should use double-perforated leader stock if your workprint is double-perforated, or single-perforated stock if your workprint is single-perforated. Count in 6 frames from the tail of the leader stock, and make a frame-line mark on the 6th frame (this is the frame that will attach to the first picture or title of your workprint). Count in 7 feet plus 28 frames from the frame-line mark toward the head of the leader stock. Mark this frame, as illustrated in Figure A-8. This mark will match the sync punch, in editorial sync, for your original film A&B rolls during conformation. Prepare the tail leaders, as illustrated in Figure A-9.

You can easily locate heads of a scene by either of two methods: (1) Hold the scene up to the light (or over a **light table**) and check the image. If it is right side up, it is "heads up"; or (2) Locate the lowest number in the series of edge-numbers for that scene. This is the head.

Step 3 The next step is to rough-assemble your workprint in continuity. Keep one or two frames of the shot/take number for each scene. Since you will be cutting and trimming frames from each scene, you need not splice the scenes at this time. Simply tape them on

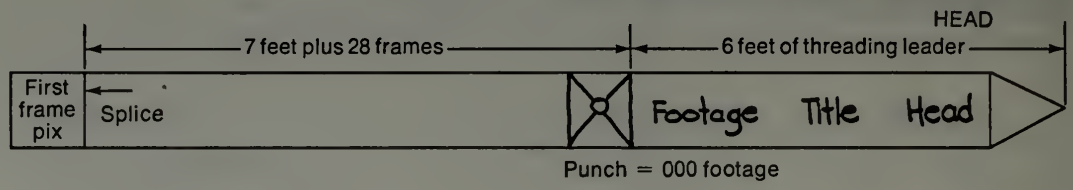


Figure A-8. Preparing Head Leader for Workprint

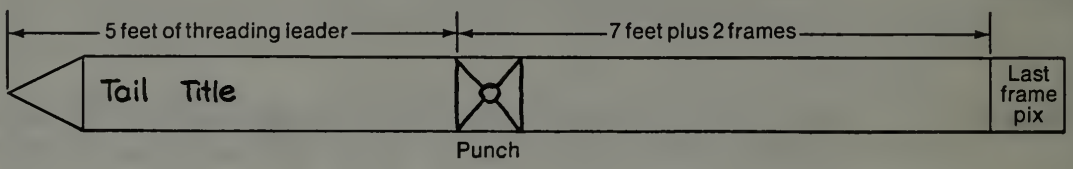


Figure A-9. Preparing Tail Leader for Workprint

both sides of the film at the joint, so the film will run through the projector. However, take care in taping the two ends; use a splicing block to keep the sprocket holes aligned and uncovered. Use no more than ½ inch of ⅜ inch pressure-sensitive adhesive tape across the joint. You need a joint that will part easily when you want it to but that will stand up under projection.

Step 4

There are no special steps in the process of cutting and trimming the rough-cut, since each film is unique and requires its own pace, movement, continuity, and effects. Project the workprint; do not rely on the hand viewer. Repeated projections will give you a feeling for the pace, juxtaposition, and action of the film. Motorized synchronizers, running at sound speed, and Moviola machines can give you a relative feeling of pace and movement, but only large picture projection will illustrate the true effects of your film. Remember that the audience does not view your film on the small screen of a hand viewer or Moviola machine.

Visualizing Dissolves, Double-Exposures, and Matching Cuts

Many cutters visualize **dissolves** or **double-exposures** (**supers**) by utilizing the light box usually found on commerical editing tables. Simply lay out the two or more pieces of film side-by-side on the light box. Then use a large magnifying glass to inspect the various action points of the shots. By sliding the pieces of film up and

down against each other, you can make adjustments to find the best matching or cutting points. Mark these as outlined in Marking Workprint for Special Effects at the end of this section.

Another method for visualizing dissolves and supers, one used to a great extent in high-budget films, is to have several trial effects printed—trying different matches and lengths until the desired effect is achieved. This method, of course, is very expensive, but it is the only certain method for finding exactly what you want.

Do not try to overlap the film pieces and run them through a viewer or projector—this simply does not work. Besides jamming the machines, the combination of the two film pieces increases the density to the point where no light will pass through the images.

Cutting and Splicing Dissolves

When you plan to make a **lap-dissolve** in the workprint, you must cut off from each scene a number of frames equal to slightly more than half the length of the entire dissolve. The splice between the two scenes will indicate the center of the dissolve. For instance, if you want a 48-frame dissolve (2 seconds), cut off at least 27 frames from the tail of the outgoing scene and 27 frames from the head of the incoming scene. This will insure that the lab has an overlap of at least 3 frames on each scene to make the 48-frame dissolve. The three frames on each scene will absorb the shock of the fade-in and fade-out.

To locate the center of the dissolve, which will become the splice in the workprint, lay out the two scenes on a light table (as outlined previously) and check the "play" of the scenes against each other. How will the tail of the outgoing scene play with the head of the incoming scene? When you have decided where you want the overlap to start on the outgoing scene, mark this frame and the corresponding frame on the incoming scene with a "0," using a grease pencil. Then count 27 frames to the left of the zero on the outgoing scene, and mark this frame and the corresponding frame of the incoming scene with an "X" (see Figure A-10). This is the center of the dissolve. Make certain that you have at least 27 frames additional frames (24 + 3) to the left of the center *X* on the outgoing scene and 27 frames to the right of the incoming scene.

You will soon learn to "play games" in matching the two scenes. For instance, many filmmakers find that the action on the tail of the outgoing scene is more important than that of the head of the incoming scene when initiating a lap-dissolve. Likewise, at the end point of a lap-dissolve, the action on the head of the incoming scene may be more important than that of the tail of the outgoing scene. A lap-dissolve is, in actual practice, a fade-in of one scene superimposed over a fade-out of another scene.

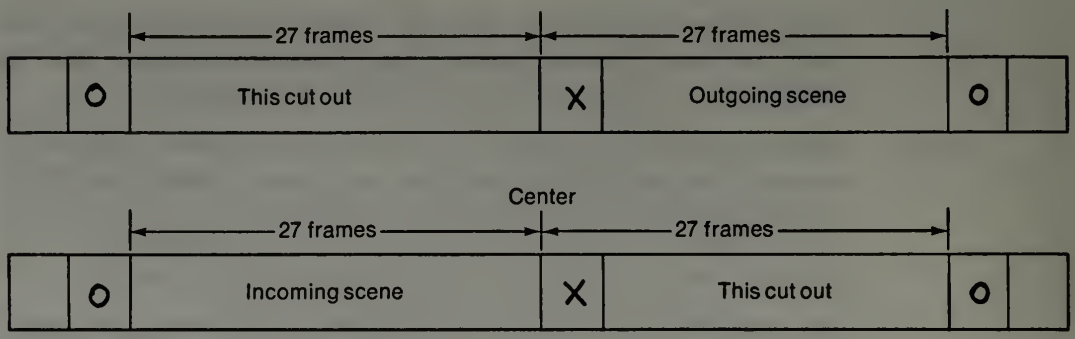


Figure A-10. Setting Up a Dissolve in Workprint

Now that you have the center of the dissolve marked, you must trim the excess frames and cut the scenes so that there will be a true center. The true center of a dissolve is not a frame, but the frame-line between the kept and discarded frames (see "Center" in Figure A-10). You find the true center by marking both the outgoing and incoming scenes on the frame-line to the left of the *X*. These marked frame-lines represent the final splice, and this is where the two scenes should be cut and spliced. As a check against splicing the wrong frames, place both film pieces in a frame-line splicer (such as a splicing block) with the *X* of the outgoing scene overlapping the *X* of the incoming scene. Cut the film pieces on the frame-line marks (left on both *X*'s), and make your splice. Your finished splice should have only one *X* (the one belonging to the outgoing scene) visible (see Figure A-11).

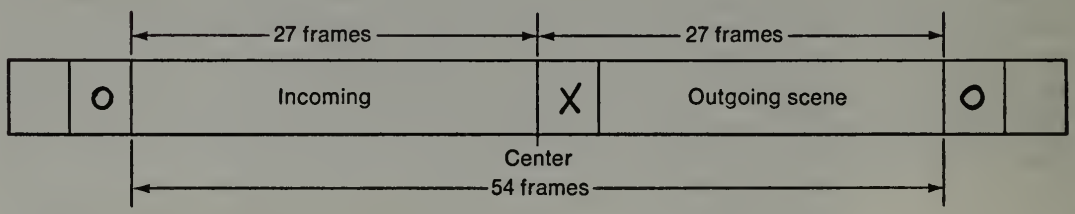


Figure A-11. 48-Frame (2-Second) Dissolve Cut in Workprint

You now have the dissolve cut and spliced into the workprint and set for a 54-frame overlap (including 3 frames at the head and tail for *fade-grab*, which may be required by the lab). This overlap will yield a true 48-frame lap-dissolve. You may, of course, shorten the effect later on the original film if you want. Or, if you want

to cut a longer lap-dissolve, simply follow the above procedure using the necessary footage, plus 3 more frames for each overlap. Be certain to check with your lab as to what length lap-dissolves they will (or can) print.

NOTE. *It is best always to mark effects on the workprint as you edit. (It's easy to forget just where you allowed overlap for dissolves, etc.). The whole dissolve overlap on your workprint can be marked from both* 0 *to the center* X. *However, in general practice with 16mm film, it is sufficient to mark the effect merely on a few frames at either side of the center* X. *Also, be sure to leave the* 0 *markings on the workprint for reference points later when you conform the original film. Indicate the number of frames needed for the dissolve on the workprint. (See Marking Workprint for Special Effects at the end of this section.)*

Slugging Missing Footage and Frames

If at the time of the **fine-cut** of your workprint you find that you are missing a few frames of a scene, or that a portion of the film is damaged, you can "slug-in" white leader to bring the workprint to the proper length. Be certain to edge-number the white leader with the number that is on the damaged or missing film. If you do not have the number, mark it with a scene-identifying number. Also mark the head and tail splice of the white leader with "unintentional splice" marks (see also the section on Marking Workprint for Special Effects).

Identifying Short Shots

Sometimes a workprint scene will be so short that it will not have an edge-number on it (in cases of quick **intercuts** or **cutaway** shots,

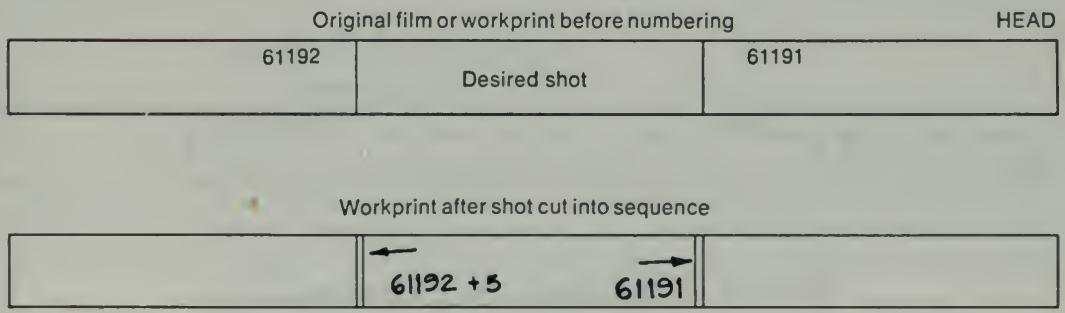


Figure A-12. Edge-Numbering Short Scenes

for example). Always check a short scene (less than a foot in length) for its edge-number *before* you cut it from the workprint roll. If there is no edge-number on the footage, find the nearest edge-number on the uncut film, and mark these numbers on the short footage 3 or 4 frames in from the splices to be made. To be accurate, you must also count the frames from the edge-numbers of the uncut film to the first and last frames of the short scene, and mark the frame counts on the short scene. Draw an arrow indicating which edge-number and frame count belongs to the head and which belongs to the tail of the short scene (see Figure A-12). If this is not done, it can take hours (even days) for the conformer (original film cutter) to locate and match the scene exactly.

Cutting and Splicing Double-Exposures

The techniques used in cutting double-exposures for the workprint are similar to those used in cutting dissolves. The basic idea is to indicate where the effect is to take place and then to cut the workprint so that it will serve as a guide in conforming the original film. In laying out the double-exposure, there are four matching points to consider: (1) the head-matching mark on the background scene; (2) the head-matching mark on the overlay scene; (3) the tail-matching mark on the background scene; and (4) the tail-matching mark on the overlay scene. To find these points is a matter of editorial decision, but you can use the procedure already described in the section on Visualizing Dissolves; and mark double-exposures as indicated in Figure A-13.

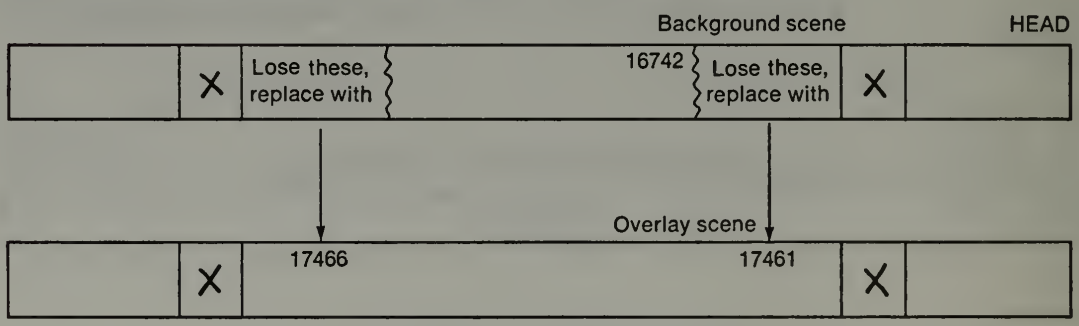


Figure A-13. Matching Marks on Double-Exposures

In addition, it is very important that you cut out a few frames of the overlay scene. Include the "X" marks and the nearest edge-numbers from the head and the tail of the overlay scene. Splice

these frames into their appropriate positions on the background scene. Without these edge-numbered frames cut into the background scene, you may not be able to find the proper original film for the overlay scene. When you have spliced the frames for the double-exposure, you must mark the frames for the special effect (see the next section).

Marking Workprint for Special Effects

Fade-In and Fade-Out. A fade-in should be indicated by a long, horizontal "V" running the length of the effect. Indicate the length of the fade, as illustrated in Figure A-14.

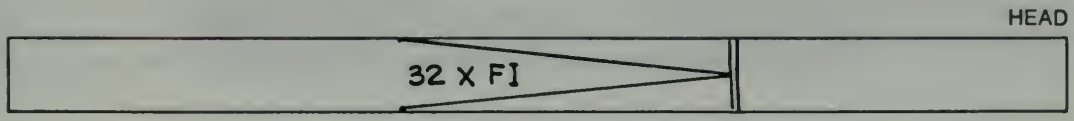


Figure A-14. Marking a Fade-In

The fade-out should be marked in the opposite way (see Figure A-15).

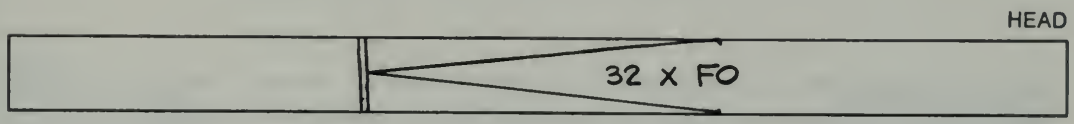


Figure A-15. Marking a Fade-Out

Dissolve. A dissolve is actually a fade-in of one scene superimposed over a fade-out of another scene. Thus, you use the same marks for a fade-in and fade-out, overlapping them as illustrated in Figure A-16. The marks should run the length of the effect, and the point at which the marks overlap should be the center of the dissolve. Indicate the length of the dissolve.

Double-Exposure. Double-exposures, superimposed titles, and the like should be marked by a wavy line connecting the scene to be superimposed with the head and tail of the background scene (see

Figure A-17). Remember, it is important that the scenes to be cut in are edge-numbered or marked in some way to correspond with the original film.

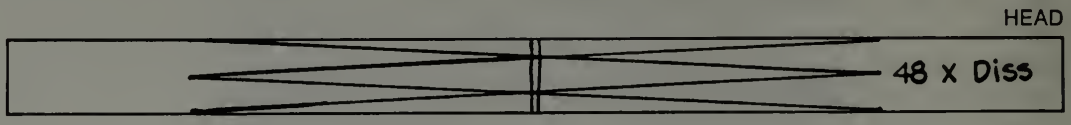


Figure A-16. Marking a Dissolve

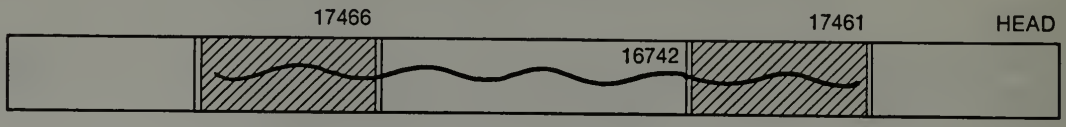


Figure A-17. Marking a Double-Exposure

Missing Scenes. Shots or scenes that are missing in the workprint but planned for in the original are indicated, as we have noted, by slugging the missing section with white leader. In addition, you should mark the effect by drawing an arrow extending from one part of the previous scene through the white leader and into the next scene (see Figure A-18).

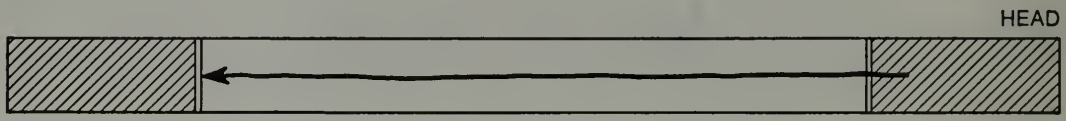


Figure A-18. Marking Missing Shots or Scenes

Unintentional Splices. Unintentional splices, those splices to be disregarded in conforming the original film, should be marked with two short lines across each splice (see Figure A-19). This is a signal to the conformer that the splice is not to be cut at that point in the original film.

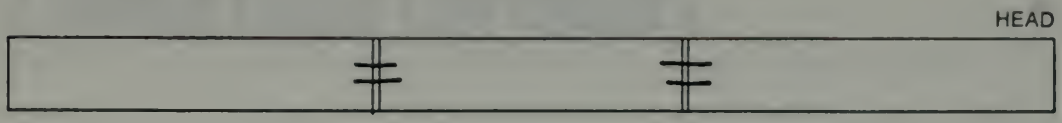


Figure A-19. Marking Unintentional Splices

Freeze Frame. There is no standard method for marking a freeze frame, so you should check with your lab. Some filmmakers indicate a freeze frame by marking an "X" on the frame to be extended with an arrow running the length of the effect and ending on the last frame of the footage required. The arrow should be drawn on an inserted piece of white leader which has been cut to the exact length of the effect (see Figure A-20).

NOTE. *Use this marking only on the workprint. The method of setting up the A&B rolls varies from one lab to another. So, as we noted, you must check with your lab before cutting the original film.*

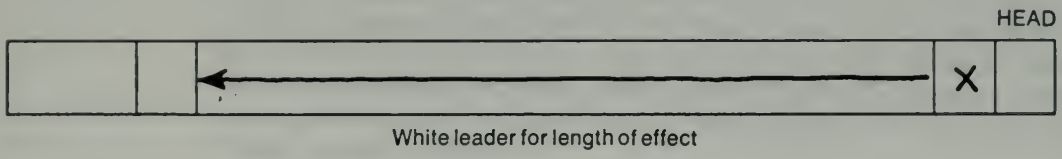


Figure A-20. Marking Freeze Frames

7. Reading Footage Edge-Numbers

Purpose To explain the need for and the utilization of footage-edge numbers.

Forms Cutting Log and Final Scene List.

Step 1 Place the punched frame (the edit-sync mark) of your workprint leader at the index arrow of the first sprocketed gang of the synchronizer. Set the footage counter to zero and the frame counter dial to "1." Unlock the synchronizer and run the film leader to the right until the tail frame of the leader (the last frame before first picture or title frame) is at the index arrow. Lock in synchronizer. Read the footage/frame count and record this on the Cutting Log under Footage/Frame Head to Tail (see Figure A-21.) Unlock the synchronizer and move the head frame of the first scene or title to the index arrow (this should be the next frame to the left). Lock the synchronizer and reset the footage counter to zero and the frame counter dial to 1.

Step 2 At this point, it is a good idea to begin to mark the head (first) frame of each scene so that each splice can be easily recognized. You may either punch a small hole in the head frame or, if you wish to preserve your workprint or are afraid of making a mistake, mark each head frame with a yellow grease pencil. Either mark should be made only on those scenes that will be straight cuts, not on dissolves or supers. *Do not mark the original.*

Step 3 Unlock the synchronizer and run the film to the right again until you come to the head edge-number of this first scene or title. Lock the synchronizer. Record this edge-number on the second line under the Edge-Number Head and Tail column. Unlock the synchronizer.

Step 4 Continue running the film to the right until the last frame of that scene is at the index arrow on the sync gang. Lock the synchronizer. Record the footage and frame count on the second line under the Footage/Frame Head to Tail column. This figure indicates the length of that scene and is very handy for narration timing and sound cutting. Next, you should find the edge-number for the tail of that scene and record this number on the second line under the Edge-Number Head and Tail column.

Step 5 Continue moving the film to the right until you reach the first frame of the next scene. Punch or mark this head frame, reset the footage counter to zero and the frame counter to 1, and then proceed as before until you have recorded on the Cutting Log all the edge-numbers and scene footage lengths and marked all the head frames (see Figure A-21).

CUTTING LOG Production No. 67-71-426 Date 2/15/72

Title Up and Down Cutter Joe Call Footage 272

Edge No. Head	Edge No. Tail	Footage/Frame Head to Tail		Shot Size	Action Direction	Shot/ Take	Scene Description
—	—	7	28	—	—	—	Head leader
91 648	91 662	14	24	MS	S →	4/1	Boy walks up to house
91 702	91 705	3	0	MLS	S ↗	1/1	Boy enters house

Figure A-21. Recording Edge-Numbers and Shot Lengths

Step 6 The scene footage/frame lengths can now be carried over to the Final Scene List, where they are recorded under the columns Footage to Start of Scene, Scene Footage/Frame, Shot Time, and Time Cue (see Figure A-22).

The importance of cataloging head and tail footage edge-numbers and scene lengths on the Final Scene List is that you have at your fingertips all the information necessary for cutting the original film and the sound track. For instance, say the footage/frame count from the leader punch to the first picture or title frame is 7 feet 28 frames and the first scene length is 14 feet 24 frames. Your first entry under Footage to Start of Scene would be "0."

Your next entry under Scene Footage/Frame would be 7/28 (7 feet plus 28 frames). This is the standard length between the sync punch mark and the first picture or title. Thus 7 feet plus 28 frames

(run at 24 frames per second) is equal to 12 5/6 seconds or, more practically, 13 seconds. Use the Timing Chart in Appendix A to convert footage/frames into time. Enter "13 s" under the Scene Time column. Since nothing is counted before the leader sync mark, enter "0" under Time Cue. The Time Cue figure represents film running time that is expended to the head of that particular scene—in this case, zero time.

Now you are ready to start your first scene entry. The leader length becomes the Footage to Start of Scene, so you enter 7/28. Scene Footage/Frame is the length of the first scene; enter 14/24. Scene Time is 14/24 converted into time or 24⅓ seconds. Time Cue is the sum of all the scene time up to a particular scene—in this case, 13 seconds of leader, which you enter as "13 s."

FINAL SCENE LIST Production No. 67-71-426 Date 2/21/72

Title Up and Down Cutter Joe Call Footage 272

Footage to Start of Scene	Scene Footage/Frame	Scene Time	Time Cue	Scene Description
0	7/28	13 s	0	Leader
7/28	14/24	24 1/3 s	13 s	Boy walks up to house
22/12	3	5 s	37 1/3 s	Boy enters house

Figure A-22. Sample Final Scene List

Footage edge-numbers are important for these reasons:

1 They provide the only practical method of matching original film to workprint.

2 They provide a filing system for quickly locating an exact piece of original film, thus saving wear and tear on the original.

3 In combination with scene length and shot/take numbers, they provide a cutting and sound script.

4 They provide the necessary sync points for synchronizing lip-sync and other sounds to the picture.

8. Breaking Down Original for Conformation

Purpose To provide a procedure for preparing the camera-original footage to be conformed to the workprint.

Form Cutting Log.

CAUTION. *Always use clean, white, cotton gloves and maintain an immaculate work area when handling original film.*

Since the final cut of the workprint is in screen continuity, the footage edge-numbers on the workprint will very likely not follow the edge-number sequence of the original film. This presents the problem of safely handling and breaking down the original film to conform it frame by frame to the workprint. There are two methods that can be applied in conforming the original film.

1 Proceed in continuity from the head to the tail of the workprint. Using this method, you must wind through hundreds of feet of original film, bouncing from roll to roll, until you find each correct shot (that is, the one that matches the workprint shot). It is the more certain but less safe of the two methods—certain in the sense that you check off each shot in script/workprint sequence, unsafe in that excessive handling of the original film will most certainly damage it.

2 Following the original film shooting order rather than the continuity of the workprint. Using this method, you must first cut each matching shot (in camera sequence) out of the original footage rolls and then roll them onto a core or hang them up on a bin (see Step 8 in this section). This saves a great amount of wear and tear on the original footage, since you roll through it just once. However, special care must be taken in recording the edge-number of each original footage shot, so that the original footage can be quickly and easily conformed to the workprint scene with minimal handling. Read carefully the methods for identifying the shots—steps 6 to 7 in this section.

Whichever method you choose, the mechanics of breaking down and conforming the original film are the same, and are outlined in the steps below.

Step 1 It is important, first, to check or recheck the accuracy of the workprint edge-numbers and shot numbers on your Cutting Log. This is done by running the workprint through the synchronizer and counting the total number of shots in the workprint (remember, you punched the head frame of each shot in the workprint for easier identification). Then, check this total number against the total number of shots on your shot list. If, by chance, they do not check out correctly, you should roll through the workprint, checking it against the list, shot by shot, until the error is found.

Be certain to count titles and special effects that may be included as white leader (slug) on the workprint. These, also, should be recorded on the Cutting Log.

Your Cutting Log should now be verified and the following columns should be completed: (1) Edge-Number Head to Tail, (2) Footage/Frame Head to Tail, (5) Shot/Take, and, if you wish, (6) Scene Description. If you did not use shot/take numbers in film production, then columns (3) Shot Size, and (4) Action Direction should have been filled in, plus, of course, the footage edge-numbers of all shots (see Section A-5, Steps 1–5, for techniques in cataloging unidentified film).

The special effects should be entered opposite Edge-Number Head to Tail column using the following code: *F*–Fade, *D*–Dissolve, *S*–Super, *E*–Extended Scene, and *FF*–Freeze Frame. Each symbol should be followed by the number of frames for that effect.

Step 2 If you have chosen Method 1 for cutting the original, proceed to mount the first shot of the workprint (titles included) and get on with Step 3. If you are following Method 2 using the footage edge-numbers, match the first desired shot of roll 1 of the original film with the same shot on the workprint and proceed with Step 3.

Step 3 Place the workprint (emulsion up) on the first gang of the synchronizer. Find the desired shot and roll the frame containing the last three digits of the *head* footage edge-number to the index arrow. Lock the synchronizer.

Step 4 Find the corresponding original film shot and place the film, emulsion down, in the second gang of the synchronizer with the frame containing the same last three digits of the head footage edge-number at the index arrow. Now the workprint and original film numbers should be the same and parallel to each other.

Step 5 Unlock the synchronizer and roll the film backward (heads to the left) to the head splice (first frame) of that shot on the workprint. Lock the synchronizer. On the head frame-line of the original film (to the left of the splice on the workprint) mark a small dot with a felt-tip pen on the edge of the film, level with the sprocket holes. *Do not mark in the picture area.* This dot marks the head frame of the original shot.

Unlock the synchronizer. If this shot is to be a cut and not a dissolve or a super, roll the two films to the right of the synchronizer for a short distance to give you working room; then count 1 frame to the immediate right of the dotted head frame on the original film and punch a hole in that frame (this frame should correspond with the frame to the immediate right of the head splice of the workprint). This punched frame will identify the head of the original film shot and will be lost in splicing.

For those film cutters who feel the punched frame would be too final, there is an alternative method of marking. Mark a "T" with a yellow grease pencil on the frame to the immediate right of the wanted head frame or the original film. The flat head of the "T" should point to the footage to be used, and the tail should point to the footage to be cut (see Figure A-23).

CAUTION. *In shots that will be cut for dissolve-in shots (the incoming shot in a lap-dissolve) leave the required number of frames for your dissolve to the right of the dissolve center on the workprint (see Figure A-10). Punch one hole (or mark a "T") to the immediate right of the first head frame of the dissolve on the original film (see Figure A-24).*

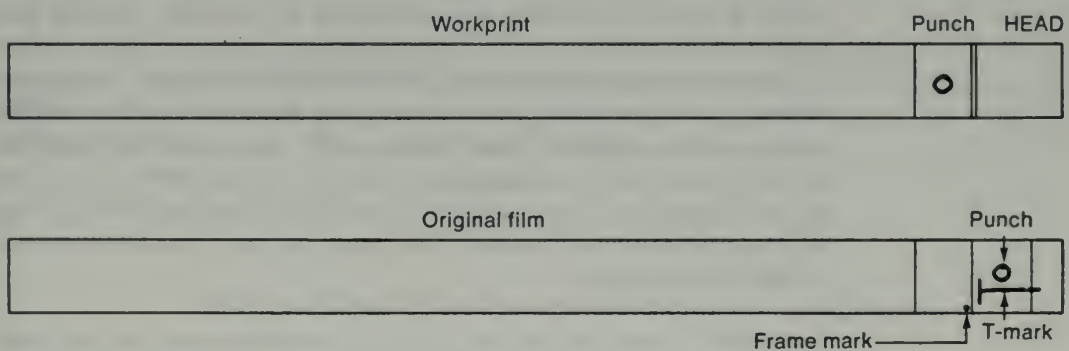


Figure A-23. Marking and Punching Head-Cut Shot on Original Film

In cutting dissolves for A & B roll printing, leave slightly more than half the length of the dissolve. For example, in a 48-frame dissolve (24 frames in and 24 frames out, plus 3 frames head and tail) you would leave 27 frames to the right of the head frame. This gives the lab an overlap of 54 frames to make the fades for the 48-frame dissolve. This does not mean that you are obligated to make a 48-frame dissolve; with the dissolve center marked, you can cut the dissolve to any shorter length that your lab can print (see Section A-6).

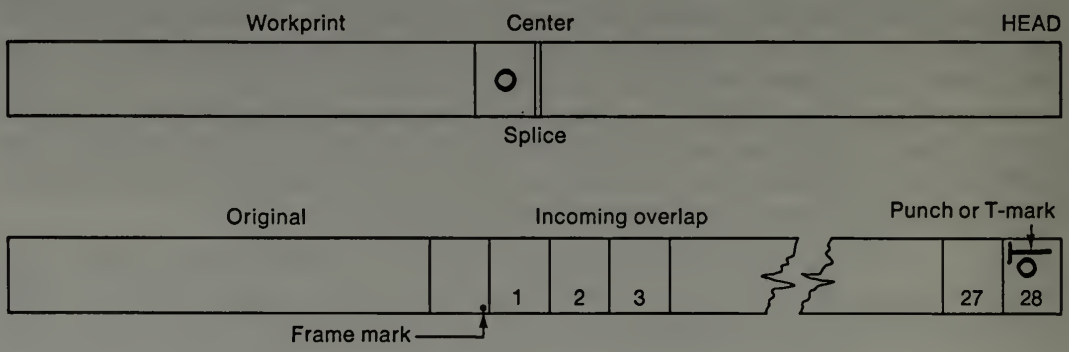


Figure A-24. Marking and Punching Head-Dissolve Shot on Original Film

Step 6 Roll the original film and the workprint forward (heads to the right) to the tail splice of the workprint. Lock the synchronizer. Check the tail footage edge-numbers on the original and the workprint, and make certain they match. On the tail frame-line of the original film (to the right of the splice on the workprint) mark a dot on the edge of the film and level with the sprocket holes, just as you did at the head. This is the tail frame of the original film shot. Again, if this is to be a cut and not a dissolve or a super, roll the two films a short distance to the left of the synchronizer; then count 1 frame to the immediate left of the marked head frame. This frame should correspond with the frame to the immediate left of the tail splice on the workprint (see Figure A-25). As in the head punch, the two tail punches will serve to identify the tail position and will be lost in splicing. This system of punching head and tails of the original also serves to position the head and tail shots for splicing, as we shall see later.

CAUTION. *In shots that will be cut as a dissolve-out shot (the outgoing shot in a lap-dissolve) leave the required number of frames for your dissolve (plus 3 frames) to the left of the dissolve center of the workprint (see page 25). Punch two holes to the immediate left of the first tail frame of the dissolve on the original film (see Figure A-26).*

Step 7 Count 2 frames to the left of the punched tail frame on the original film and cut the film on the frame-line, using a good pair of scissors (never tear original film). If you know that this shot is to be intercut, or that you cannot afford to lose the two extra frames, cut the film on the right frame-line of the punched frame instead of two frames to the left.

Step 8 Roll the synchronizer back to the head of the shot, count two frames to the right of the punched frame, and cut on the frame-line as

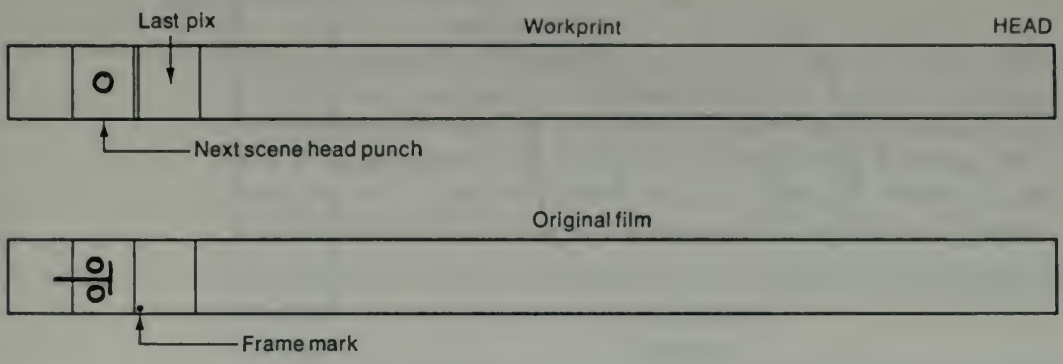


Figure A-25. Marking and Punching Tail-Cut Shot on Original Film

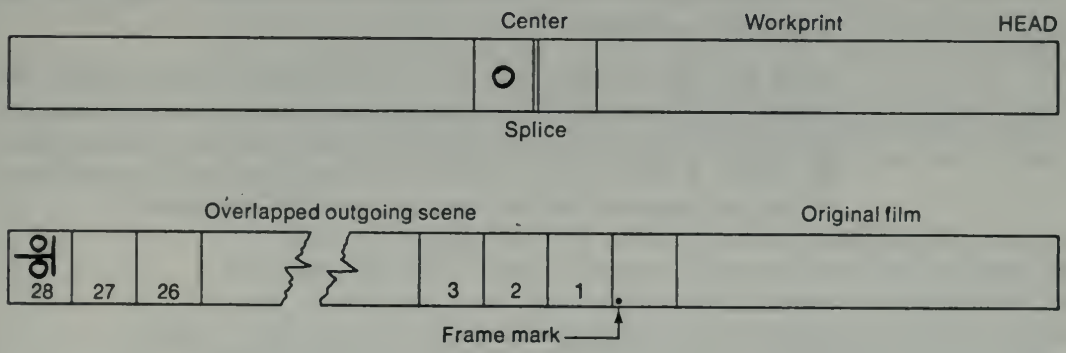


Figure A-26. Marking and Punching Tail-Dissolve Shot on Original Film

you did in Step 7. If you are mounting this shot directly into the A&B rolls, there is no need to mark it. If, however, you are going to hang it (as a general rule, *hang* a shot of up to 5 feet in length and *roll* shots that are longer), put 2 inches of 3/8" masking tape on the waste head frames and write the shot/take number and a progressive number denoting that shot's numerical sequence in the film. Even if you hang your shots on a bin or a rack, you should still use the tape as a label. Always hang a shot head up, and be certain that the tail of the shot is in a cloth-lined bin, where it cannot be scratched.

If you want to core or roll the shot, insert the waste tail frames into the slot of a core or flange and carefully wind the film forward

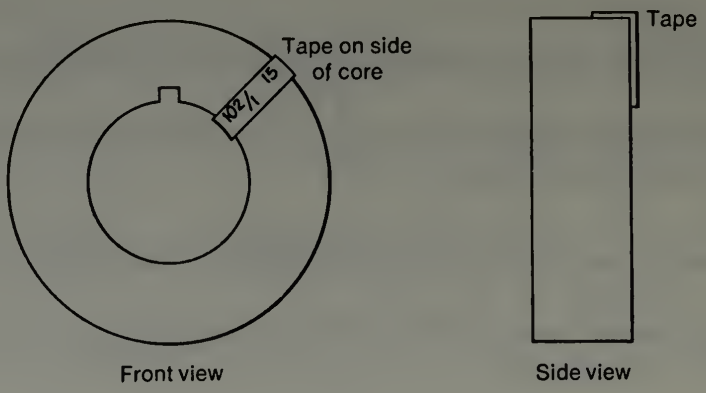


Figure A-27. Placing Tape on a Core

to the head of the punched frame. To minimize handling of the film, it is a good idea to cut the head frame only after the rest of the film is rolled.

Once the film is rolled and cut, put a length of tape across the wasted head frame and down the side of the core (see Figure A-27), and mark it as you would a hanging tape (see Figure A-28). Store the roll in a clean can and list its numbers on the lid of the can. Do not put tape on the roll; this will damage your shot.

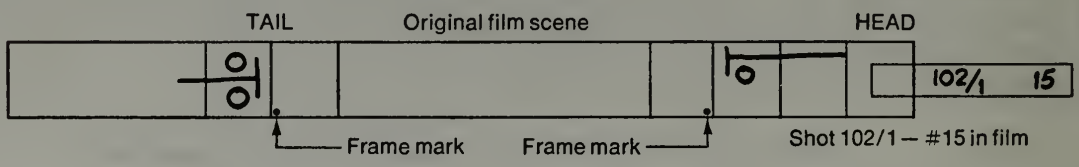


Figure A-28. Marking Tape for Hanging Original Film

Be sure to check off the footage edge-numbers of the cut film on the list taped to the lid of the original film storage can and on the Cutting Log.

Step 9 Repeat all steps until you have completed the breakdown of the original film.

Also, do not forget to roll up and identify all the out-takes. Store these out-takes in separate cans with identification on the lid.

Zero-Cut Printing

Another method for breaking down original film for conformation is the zero-cut technique. This method differs from the foregoing on head-cuts in that you extend the original film at the heads and tails of each scene by at least, but not limited to, 2 frames. Thus, when the A&B rolls are placed in a synchronizer, there will be a 4-frame (or more) overlap at the heads and tails of each scene.

This method of cutting and printing A&B rolls is more flexible than the head-cut method previously discussed.

CAUTION. *Check with your lab; they may not have a zero-cut printer. If this is the case, your zero-cuts printed on a continuous type printer will usually appear as 1-frame dissolves—the reason being that the special zero-cut printer makes scene changes (cuts) by means of a rapidly opening and closing shutter. This shutter makes the scene change appear as a cut.*

The main advantages of zero-cut printing are: (1) it will allow you to recut your A&B rolls or to trim down a sloppy or overlong scene; (2) it lessens the chance of *out-of-sync* A&B rolls (see page 58); and (3) it allows you to save (or bury) frames of original film that you may not want to cut. You will probably find that a combination of both the head-cut and zero-cut methods will best serve your needs.

To mark your original film for zero-cut, simply extend the head and tail markings by at least 2 frames. (More frames can be used as long as you don't run into the following scene.) Zero-cuts can be used on cuts, dissolves, and double-exposures, but make certain that the part of a dissolve that you don't want printed is covered by black leader on the other roll (see Section A-10, page 53, for the technique of conforming zero-cut film).

9. Preparing Printing Leaders

Purpose

To provide a procedure for marking and syncing standard printing leaders to be spliced to the original rolls.

A complete and detailed method for preparing standard printing leaders, with sound track advanced, will be found in the Association of Cinema Laboratories (ACL) Handbook.* However, since most students prepare head and tail leaders in editorial sync (level sync, dead sync) rather than in printing sync (**projection sync**) with the sound track advanced, this following, less complicated method will prove more practical. Note that this section outlines the steps necessary to cut, splice, and mark the printing leaders for *picture rolls only*. Instructions for preparing printing leaders for sound rolls are outlined in Section B-11.

Step 1

To prepare *head* leader for each picture roll, you will need 12 feet of white leader and 2½ feet of black leader (clear leader for negative films). To prepare the *tail* leader for each roll, you will need 9 feet of white leader and 4½ feet of black leader (clear leader for negative films). It is recommended that you use a dyed white leader stock, such as Eastman Kodak White Leader (#WL-452 for double-perforated or #WL-458 for single-perforated). This stock was especially developed for this purpose and provides a neat, professional leader. However, any clean, unprocessed positive print stock may also be used.

Step 2

To prepare the head leader for *each* picture roll, splice the 2½ foot section of black leader (clear for negative) to the tail of the 12 foot piece of white leader. The purpose of the black (or clear) leader is to give the printer an opaque area for a fade-in at the head of the actual picture. If there is any single-perforated film in your picture rolls, use only single-perforated leaders. Use double-perforated leaders only when all the film in each roll is double-perforated.

*See pages 17–20. The handbook is available from the Association of Cinema Laboratories, 1925 K Street, Washington, D. C. 20006, or from your local member lab.

For release prints, the *SMPTE Universal Leader* may be used in place of black or clear leader. This provides a "seconds" countdown for the projectionist. Use a negative leader for negative films and a positive leader for positive and reversal films. Black and white leader may be used for color films. Ask your lab for information about the Universal Leader and for assistance in cutting this leader into your printing rolls.

Mark the head leaders as indicated in Figure A-29.

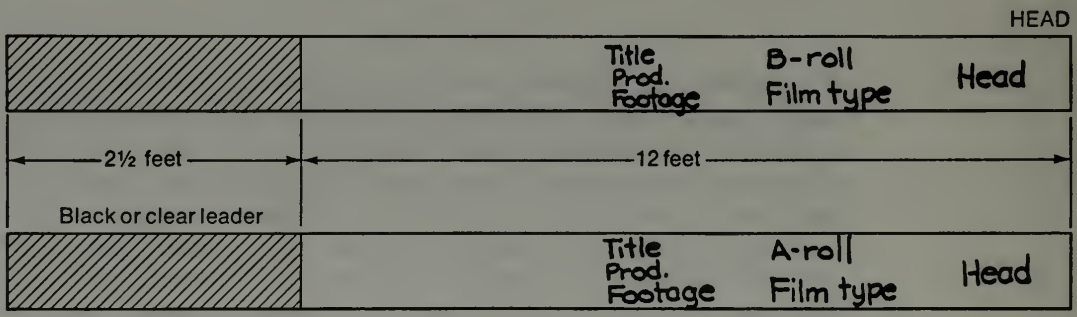


Figure A-29. Marking Head Leaders for Picture Rolls

Step 3 To prepare the *tail* leader for each picture roll, splice the 2½ feet of black leader onto the heads of the 9-foot piece of white leader. Then, to the tails of the white leader, splice the remaining 2 feet of black leader. This final 2 feet of black leader is used to indicate the tail of the show; you know at a glance whether the film is "heads up" or "tails out." Mark the tail leaders as indicated in Figure A-30.

Step 4 Now the next step is to sync the printing leaders to the workprint. Mount your workprint with the first frame of picture on the first gang of the synchronizer. Set footage and frame counters to 0. Then roll the synchronizer to the left for 2 feet (80 frames) into the head of the workprint leader. Lock the synchronizer.

Step 5 Mount the A-roll head leader on the second gang of the synchronizer with the last frame of white leader (adjacent to the black leader) at the index arrow of that gang. Mount the B-roll head leader on the third gang in the same manner as the A-roll at the index

arrow of that gang. Mark that frame-line on the workprint which is in editorial sync with the A- and B-roll leader splices. This mark can be either yellow or red. Your synchronizer setup should now look like Figure A-31.

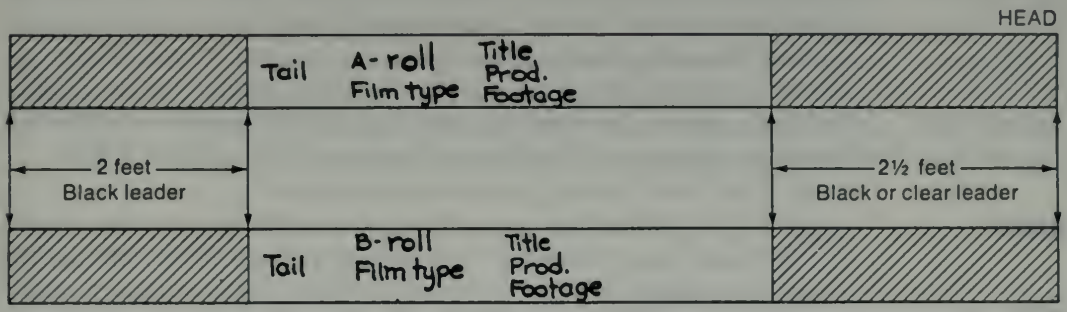


Figure A-30. Marking Tail Leaders for Picture Rolls

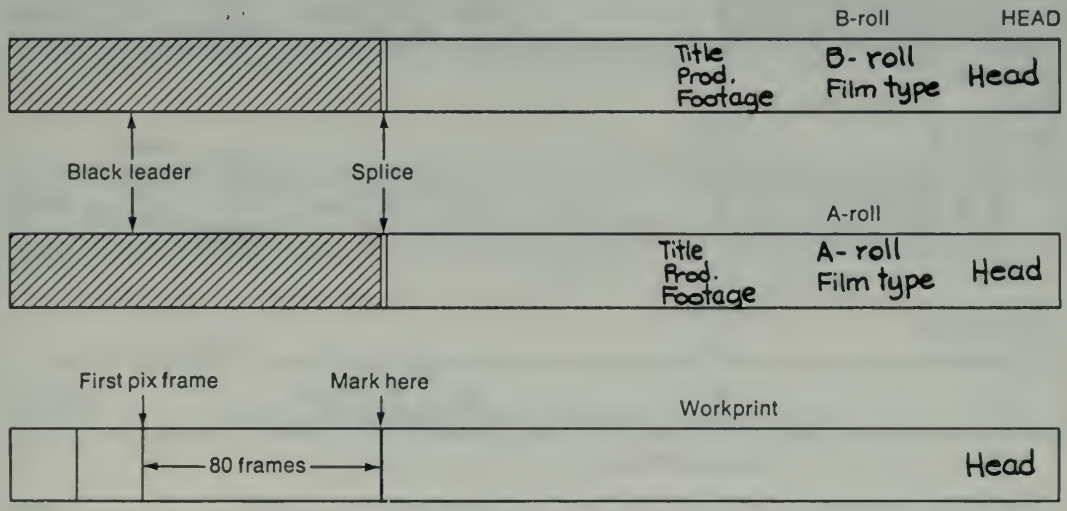


Figure A-31. Marking Head-Leader Position for Picture Rolls

Step 6 Unlock the synchronizer and roll the films to the right until the first picture frame is at the index arrow of the synchronizer. The footage counter should read zero, and the frame counter should read zero. Lock the synchronizer.

Step 7 On both the A- and B-rolls, carefully mark an "X" with a yellow grease pencil on the black leader frame that is 1 frame to the right of the first picture frame of the workprint. This *X* should now be in line with the last frame of the workprint leader. As a check against cutting the wrong frame of black leader, you should also mark the left frame-line of the *X*-marked frame with a yellow grease pencil. This line should be opposite the splice on the workprint between the white leader and the first picture frame (see Figure A-32).

Step 8 Unlock the synchronizer and roll the film to the left until you reach the edit-sync punch mark on the workprint leader. This should be 7 feet, 28 frames from the first picture frame of the workprint. Mark the corresponding frames of the white leader on the A- and B-rolls with an "X," as indicated in Figure A-32.

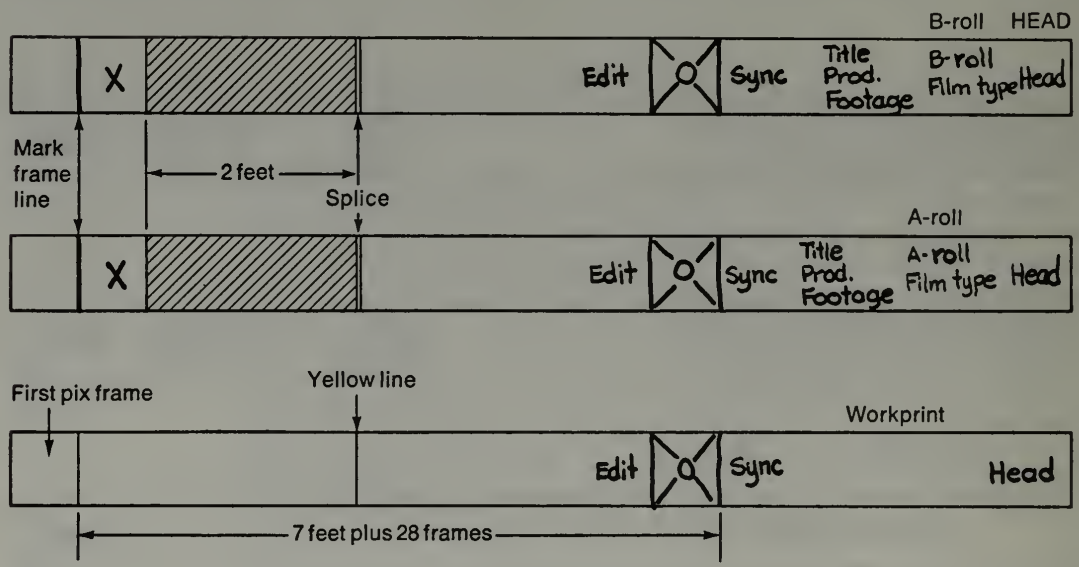


Figure A-32. Marking Head Leaders for Edit-Sync

Step 9 You are now ready to find and mark the sync points on the tail leaders. Mount your workprint with the last picture frame on the first gang of the synchronizer at the index arrow. Set the footage and frame counter to 0; then roll the film to the right for 80 frames into the tail of the workprint leader. Lock the synchronizer.

Step 10 Mount the A-roll tail leader on the second gang with the last frame of the 2½-foot section of black leader at the index arrow of that gang. Mount the B-roll tail leader on the third gang in the same manner. Mark that frame-line on the workprint which is in editorial sync with the A- and B-roll leader splices between the black and white leaders. The marking color should be yellow. The footage counter should now read 2 feet, and the frame counter should read *0*. The synchronizer should look like Figure A-33.

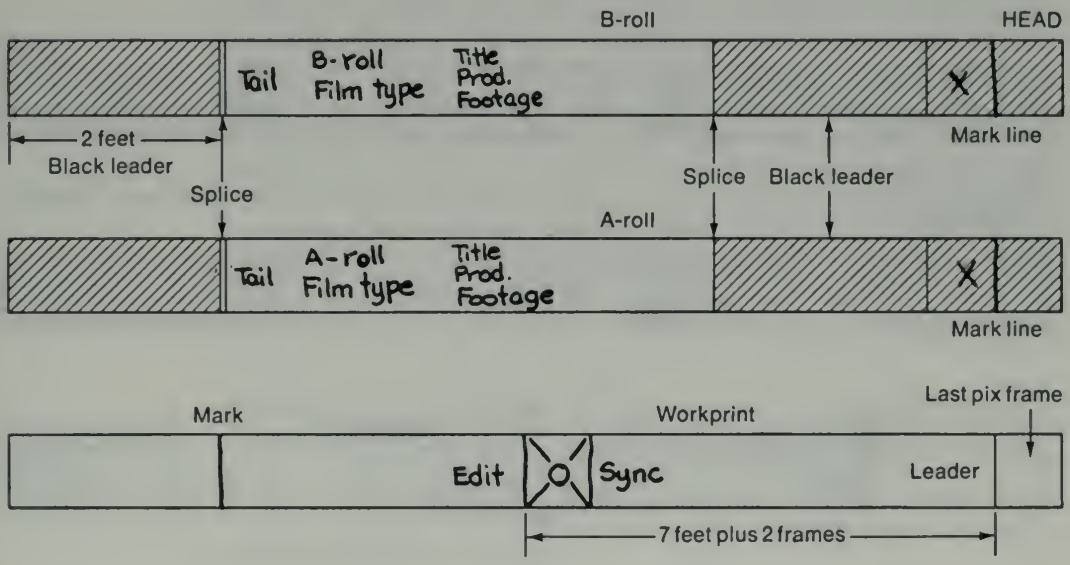


Figure A-33. Marking Tail-Leader Position for Picture Rolls

Step 11 Unlock the synchronizer and roll the film to the left until the last picture frame of the workprint is opposite the index arrow of the first gang. The footage and frame counters should both read *0* (2 feet up and 2 feet back). Lock the synchronizer.

Step 12 On both the A-roll and the B-roll, carefully mark a yellow "X" on the black leader frame that is 1 frame to the *left* of the last picture frame of the workprint. The "X" should be in line with the first frame of the workprint leader. These X-frames will splice onto the last picture frames of the A- and B-rolls. As a check against cutting the wrong frame of black leader, you should also mark the right frame-line of the X-frame in yellow. This line should be opposite the splice on the workprint where leader joins the last picture frame.

Step 13 Unlock the synchronizer, and roll the films to the right until you reach the edit-sync punch mark on the workprint leader. This should be 7 feet plus 2 frames from the last picture frame of the workprint. Mark the corresponding frames of the white leader on the A- and B-rolls with an "X" as shown in Figure A-34. This completes the preparation of printing leaders for picture rolls.

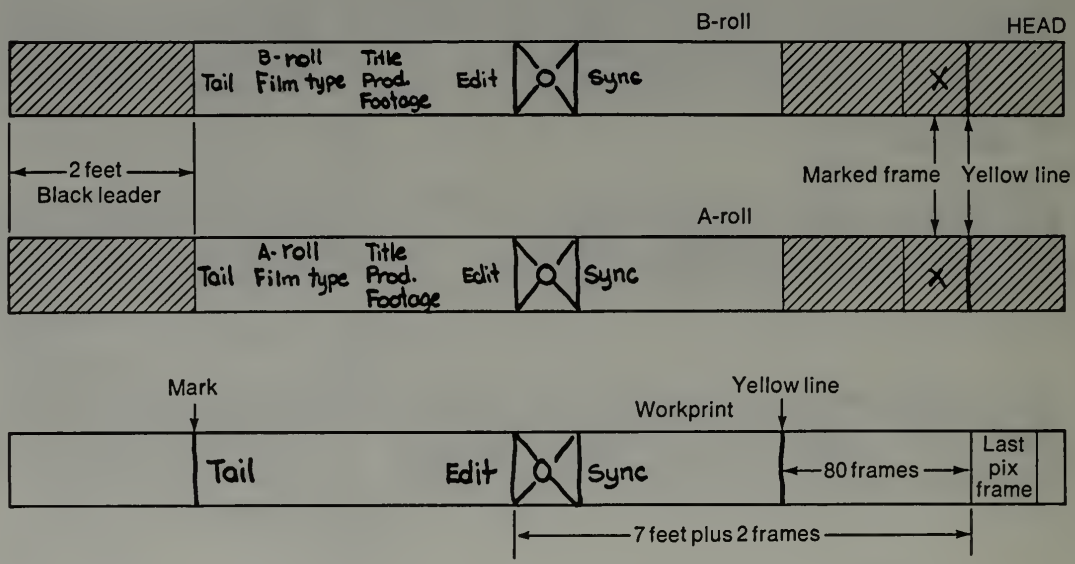


Figure A-34. Marking Tail Leaders for Edit-Sync

10. Conforming Original to Workprint

Purpose To provide procedures for proper conformation of the camera-original footage to the workprint.

Forms Cutting Log and Final Scene List.

The best method for making invisible splices in mounting the original A&B rolls is the checkerboard technique. The checkerboard technique is, as its name implies, a method of alternating the pictures with black leader to mask the areas in the film covered by the overlapping splices, thus making the splices invisible when the A&B rolls are printed (see Figure A-35). In order to accomplish this technique, you must use a splicer that makes one of the cuts on the frame-line and the other cut in the picture area. Such standard splicers as the Griswold Model R-3 and the M&H Hot Splicer Model 816 will do this. Besides making good, square-cut splices, these splicers have two separate sets of registration pins for making splices toward or away from the operator.

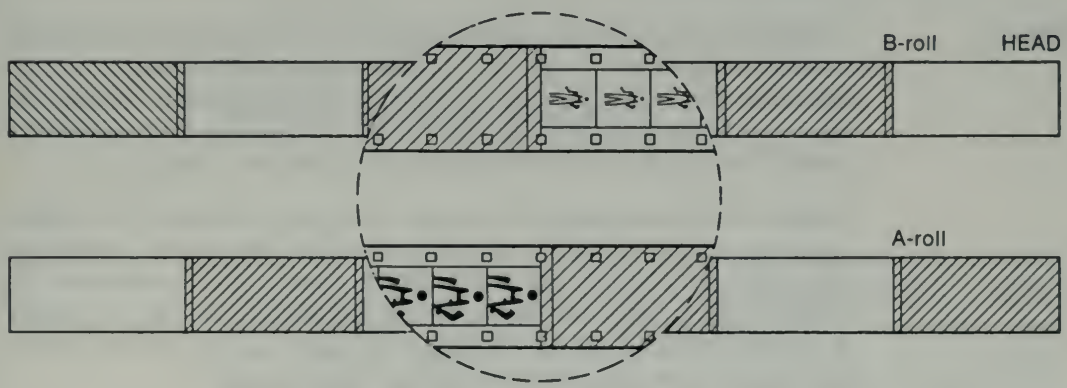


Figure A-35. Making Invisible Splices with Checkerboard Technique

CAUTION. *When splicing picture to the black leader, always place the picture on the left side of the splicer (the scrape side) and always scrape the picture, never the black leader. Also be sure to test your splicer before attempting to conform original film.*

If you have followed the procedures in Sections A-8 and A-9, you are ready to begin to splice your original film, the second phase of conforming original footage to the workprint. The easiest method is to start at the head of each roll of original film and work to the tail. This keeps each scene or shot in screen continuity. It also allows you to run the workprint through the synchronizer along with the A&B rolls—the only reliable method of checking the accuracy of your work on the original film.

Step 1 Lock the synchronizer and set the frame counter to *0*. Mount the B-roll head leader on the third gang of the synchronizer, with the edit-sync mark at the index arrow. Mount the A-roll head leader in the same way on the second gang. Mount the workprint punch mark at the index arrow of the first gang. All three edit-sync marks should now be parallel.

Step 2 Unlock the synchronizer. Roll it forward (heads to the right) until you reach the yellow *X*s on the black leader of the A&B rolls. These *X*s should be opposite the last frame of the workprint leader, and the yellow frame-lines should be opposite the workprint splice. The first picture frame of the workprint should be to the immediate left (see Section A-9). If the arrangement is correct, proceed to Step 3. If not, erase the yellow *X*s on the black leader of the A&B rolls and re-mark the *X*s in the correct position. Remember, when rolling films to the right, you should do your splicing on the left side of the synchronizer. Doing this preserves the sync in all the rolls on the synchronizer.

Step 3 Locate the first shot on the original film. Its progressive-continuity number should be 1, and its footage edge-number should correspond to the same number on the first workprint shot. Check the shot on the original film for the single-hole punch that marks the head of the shot and the frame that will be lost in splicing.

Unlock the synchronizer; then roll the film to the left for a short distance in order to gain working room for the splice. Splice the first shot onto the A-roll black leader, losing the punched or *T*-marked frame and the frame at the immediate left of the yellow *X* on the black leader. The first picture frame on A-roll should now be opposite the first picture frame on the workprint.

Step 4 Now splice a piece of black leader, slightly longer than the first A-roll shot, to the B-roll leader. (It is a good idea to use two rolls of black leader in "checkerboarding," one for the A-roll and one for the B-roll. Mount the rolls of black leader on extra rewinds or on the rewind extensions.) Keep the yellow *X* on B-roll black leader. All three splices should be parallel, and all the rolls should be in

sync from edit-sync to first picture frame (see Figure A-36). For zero-cut printing leave at least two frames on the head of A-roll and match the first frame of the A-roll with the first frame of workprint, cutting into the A-roll black leader to accommodate the extra frames of the A-roll.

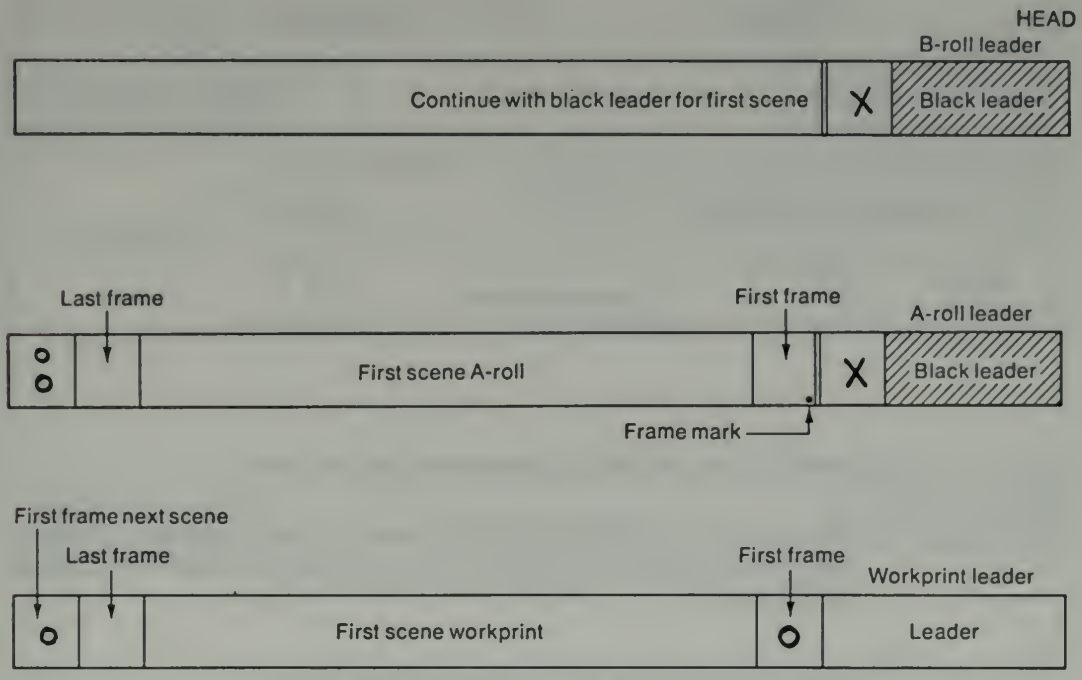


Figure A-36. Splicing First Shot in A-Roll

Step 5

Being careful not to let the original film drag, roll the films forward to the tail of the first shot on roll A. Splice black leader onto the last A-roll picture, losing the double punch mark, and then return this splice to the index arrow on the synchronizer. Mark a yellow line across the B-roll black leader on the frame-line opposite this splice on the A-roll. Now cut the B-roll black leader a frame or two to the left of this marked frame and splice the second shot of the original film to this black leader, overlapping the single-hole punch mark with the frame to the left of the frame-line marked with yellow. The splices on all three films should be opposite each other (see Figure A-37). For zero-cut leave extra frames on the tail of the A-roll and match the first frames.

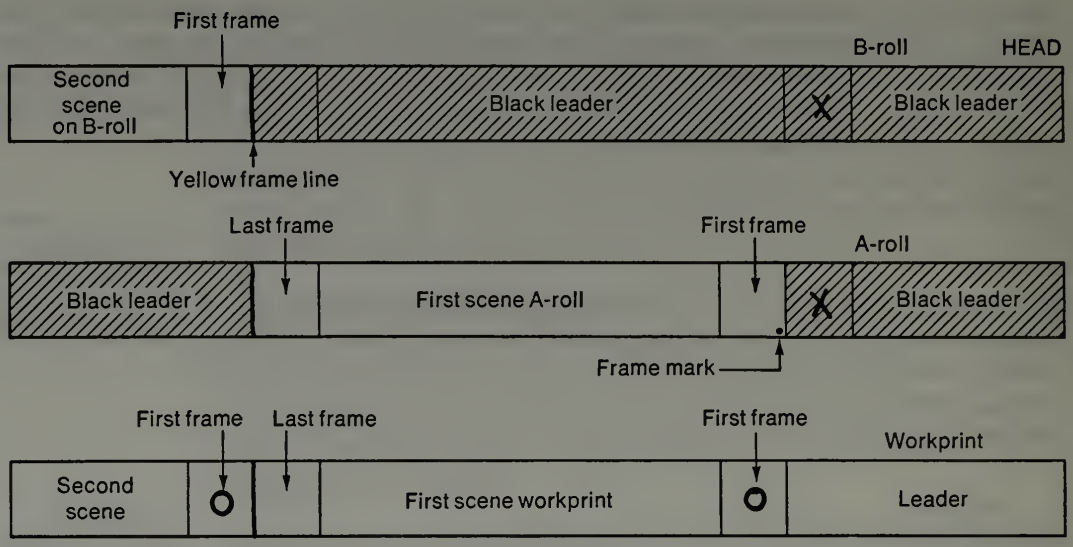


Figure A-37. Splicing Second Original Film Shot onto B-Roll

Continue this procedure until you come to a special effect (dissolve, fade, etc); there you must use one of the following special splicing techniques.

Mounting Fades on Positive A&B Rolls

If you plan to follow a fade-out by a fade-in on positive or reversal rolls, it is recommended that the fade-in scene on the one roll be carried across to the other roll without allowing any overlap (see Figure A-38). The procedure is the same as for checkerboarding. Instructions should be given to the lab regarding the effect's position and length (use Laboratory Printing Instructions, Section B-12).

Mounting Fades in Negative Rolls

In cutting fades for negative rolls, you should keep the fade-out scene and the fade-in scene on the same roll. Use clear and black

leader as illustrated in Figure A-39. (Be sure to consult your lab before proceeding with negative-roll cutting.)

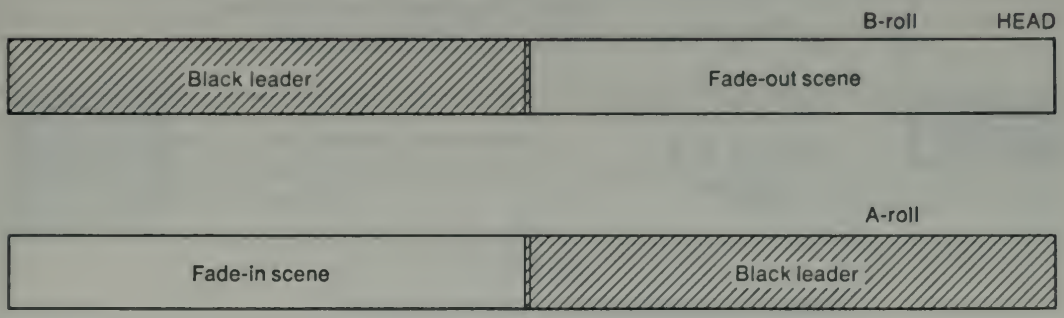


Figure A-38. Mounting Fades for Positive Rolls

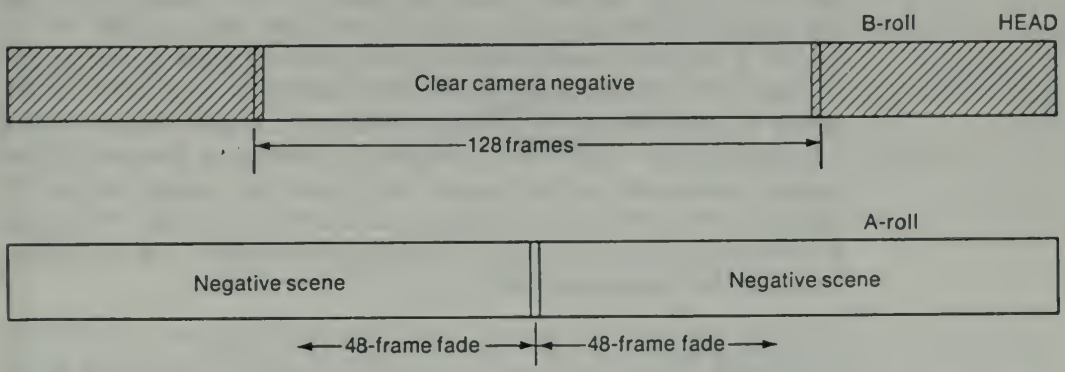


Figure A-39. Mounting Fades for Negative Rolls

Mounting Fades and Dissolves after a Cut

Most labs require a minimum of 54 frames of black leader after a cut before starting a fade or a dissolve (see Figure A-40). Check with your lab.

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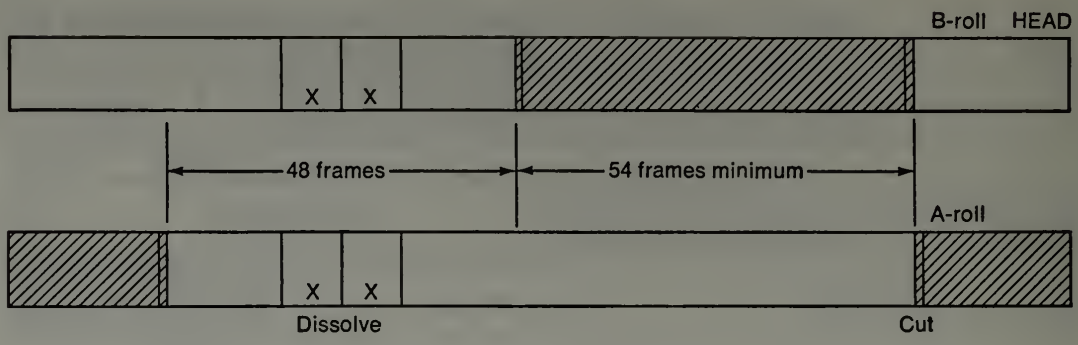


Figure A-40. Mounting Special Effects after a Cut

Mounting Dissolves on A&B Rolls

To mount dissolves, treat the splice between the in-shot and the out-shot on the workprint as the center of the dissolve. Set up the center *X* (the tail-shot center), and mark the picture "A" (if it's the A-roll) on the frame to the *right* of the center splice of the workprint. Then mount the B-roll to the *left* of the workprint center splice so that the B-roll picture overlaps its black leader. At the tail of the A-roll the overlap will be 27 frames to the left of the center splice, and at the head of the B-roll the overlap will be 27 frames to the right of the center splice on the workprint. This gives a 3-frame additional overlap at the heads and tails of the A&B rolls, or a true 48-frame dissolve.

Now roll the films to the left, until the B-roll single punch mark is opposite the index arrow of the synchronizer. Remove the B-roll *picture*. On the B-roll black leader, mark a yellow line on the left frame-line of the frame that is opposite the index arrow of the synchronizer. Roll the films to the left of the synchronizer to allow room to splice; cut the B-roll black leader a frame or two to the left of the yellow line, and splice the B-roll picture onto this black leader, losing the punch mark. Then, splice black leader to the A-roll, losing the double-hole punch mark.

Roll the films back in the synchronizer until the center of the dissolve is opposite the index arrow. Since most labs require that the center of each dissolve be marked with a small "*x*" in each of the two adjacent frames in the center of each fade, this should be done on both the A- and B-rolls. The two small *x*s should be made on

the emulsion side of the films between the sprocket holes (but *outside* the picture area), using a sharp scriber or a rapidograph pen with quick drying ink. When the A&B rolls are placed in the synchronizer in correct sync, these *x*s appear opposite each other on each roll (see Figure A-41).

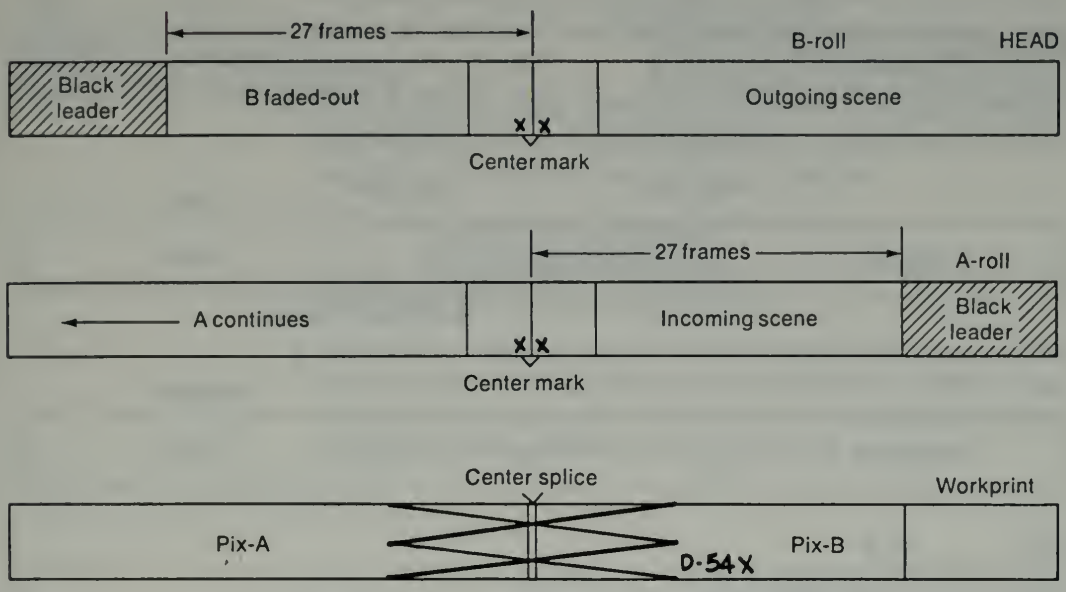


Figure A-41. Mounting Dissolves into Original Rolls

Check both sides of the dissolve to make certain there are 27 frames to the right and to the left of the center. The dissolve is then complete.

Mounting Double-Exposures on A&B Rolls

Double-exposures require no special setup, other than the technique used in mounting a dissolve. You must decide whether you want the supered image to "pop" onto the screen or to fade-in. If you want a fade, you must give instructions to the lab (on the Laboratory Printing Instructions) as to the length and position of the fade. It is recommended that you also mark your workprint with this information.

Correcting Out-of-Sync A&B Rolls

Out-of-sync A&B rolls are splices in a checkerboard array that do not match (see Figure A-42).

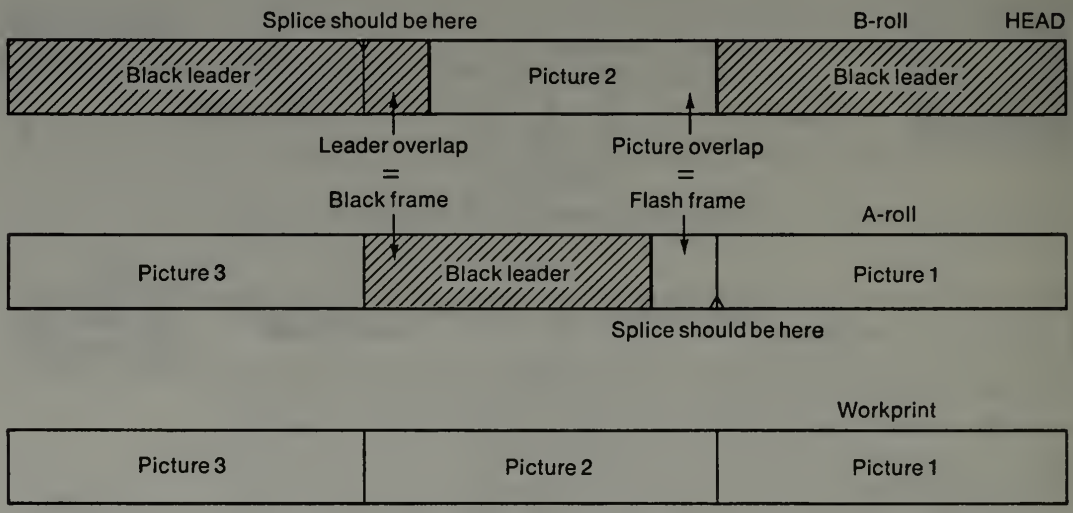


Figure A-42. Out-of-Sync A&B Rolls

If the rolls containing out-of-sync splices are printed (in the reversal film process), the result will be an overexposed "flash" frame wherever the frames of A&B-roll *pictures* overlap. Where the A&B black leader overlaps, of course, black frames will be printed. As a rule labs will not correct out-of-sync rolls, so you must know how to put all the out-of-sync splices back into their proper position according to the workprint, without throwing the rest of the picture and track out-of-sync.

First, check the entire length of original film and workprint in the synchronizer; and mark any out-of-sync splices, in the proper position, *on the workprint*. Do not remove the rolls from the synchronizer. Work with the black leader only.

If the splice is short, that is, to the left of the workprint splice, you must *add* the appropriate number of frames to the black leader

(see Figure A-43). Work with the black leader only. *Do not* cut or add to the picture, or you may lose a frame of picture when you break the splice. To resolve the problem of a short splice, take the following steps:

1 Run a separate piece of black leader on an empty sprocket gang (or on the workprint). Mark on this leader the positions of the splice on the workprint and the short splice on the A- or B-roll. *Add one additional frame* (this frame is lost in splicing).

2 Run the film at least 12 frames to the left of the synchronizer, and frame-line cut the black leader (anywhere on the black leader, but not too close to the roll splice).

3 Splice in the marked piece of black leader.

4 Return the original-film splice to the index arrow on the synchronizer. Check for alignment.

5 Check the following scene and the preceding scene of this splice. When you have one splice out-of-sync, it often throws the others out as well. However, they sometimes correct themselves when the first faulty splice is corrected.

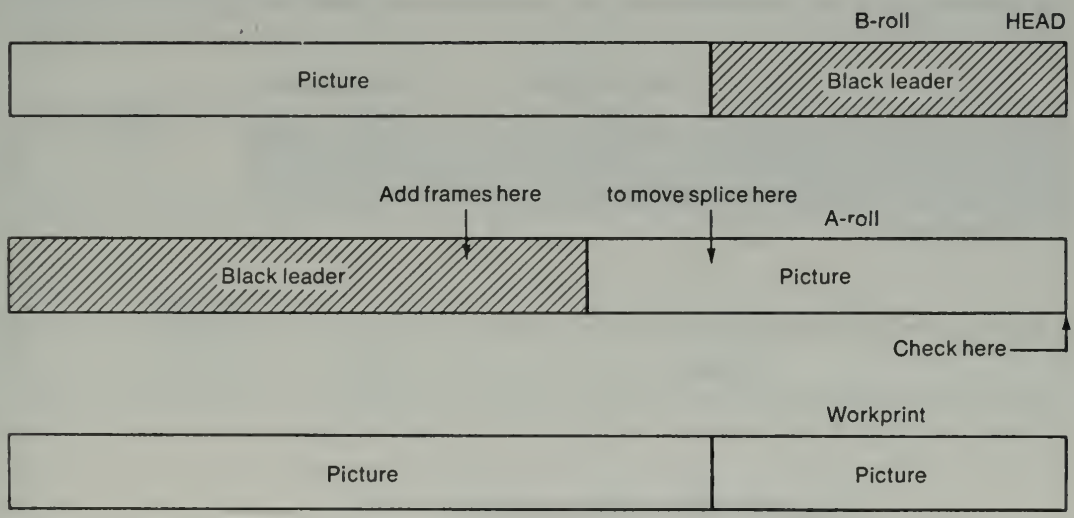


Figure A-43. Correcting Short Splices

If the splice is long (on the right side of the workprint splice), you must *cut* the appropriate number of frames out of the black leader (see Figure A-44). Be careful, however, that in shortening the black leader, you don't pull up the following scene as well. Check the following scene to see if it is also short. If so, you can correct both of them in one operation as follows:

1 Check preceding and following scenes for short or long splices.

2 Count the number of long frames in the black leader. Subtract one frame (this is lost in splicing), and then cut the appropriate number of frames out of the black leader.

3 Splice the black leader together—on the left side of the synchronizer.

4 Roll the films back to the original splices and check their alignment.

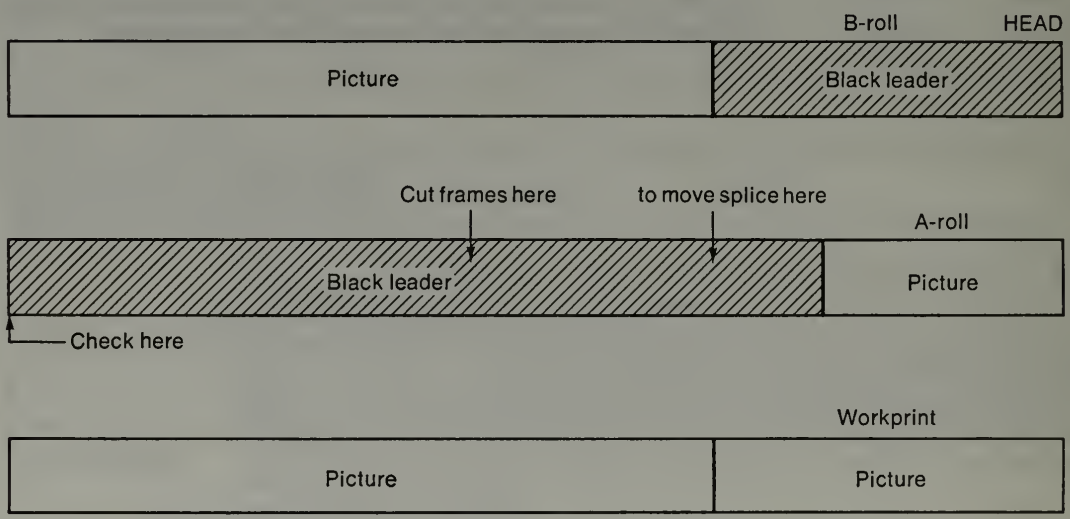


Figure A-44. Correcting Long Splices

Other hints on resolving out-of-sync A&B rolls:

1 Check your film from head to tail, especially the alignment of the edit-sync marks. You could be displaced there.

2 Find the center scene of the out-of-sync scenes and write down the number of frames that each scene is out, as well as whether the scenes are long or short. Then, using this information, see if some of your corrections will offset other mistakes.

3 If you can't seem to make headway in correcting the out-of-sync splices, walk away from your work and have a cup of coffee and then start again with a fresh mind and spirit. Don't lose your "cool"; mistakes can be corrected.

Part B. Sound Cutting

The sound track must be a source of great concern to the filmmaker, no matter how simple his film may be. The artistically and skillfully planned sound track adds perspective, meaning, and dramatic impact to the screen visuals. Indeed, more films are probably ruined or weakened by an inappropriate sound track than by poor camera work or inadequate editing. The sound process—from original-source recording, to sound cutting, to final re-recording—requires good judgment, imagination, experience, and skill.

The sound-cutting portion of this handbook is divided into two categories: **double-system** sound cutting (Sections B-1 through B-13) and **single-system** sound cutting (Sections B-14 through B-16).

Double-system sound cutting (that is, cutting picture and sound that are located on separate films) may consist of manipulating both non-synchronous sound (**wild sound**) and synchronous sound (such as **lip-sync** dialog). Wild sound is usually considered as being off-camera, or recorded at a different time or place than the picture. Whereas sync sound is recorded at the same time and place, and simultaneously with the picture, or, as in the case of post-synchronization (**dubbing**), it is recorded at a different time and place, but in an exact frame-to-frame relationship with the projected picture.

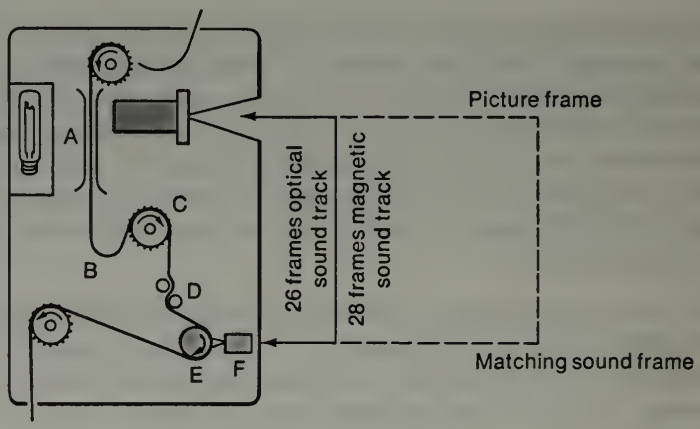
There are two common methods for recording double-system sound tracks for dialog or other synchronous sounds: (1) recordings made on synchronous, sprocketed, magnetic (or optical) film recorders and (2) recordings made on ¼-inch (or in some cases, ½-inch) non-sprocketed tape recorders, in which the sync is established by applying a 60-Hz (Hertz, or cycle) sync-pulse generated by the camera (or another device: a crystal tuner) onto the recording tape. The first method provides a sync-recording on a perforated film ready for double-system cutting. In the second method the sync-signal must be transferred in a synchronous process called resolving, while the sound signal is transferred (re-recorded) onto the perforated film suitable for double-system cutting. Both methods are in use today, but the second method is becoming standard in the film industry, especially in on-location production.

The majority of filmmakers today use magnetic film for transferring, cutting, and re-recording. It is easier to handle, has better sound fidelity, can be played back immediately, and is less expensive to transfer from tape. Optical film is used mainly in release printing. There are two standard positions for the sound band on 16mm perforated magnetic sound film: (1) edge-track and (2) center-track. They both perform equally well; however, a sound track must use the same sound-band position throughout the film. Check with your lab to determine which type of track position you should or can use.

As in camera-original film, magnetic sound film has an emulsion, called **oxide**, which responds to magnetic force (**flux**) instead of light, as in camera-original film. From now on, the emulsion side of magnetic sound film will be referred to as oxide.

For double-system sound cutting, student filmmakers usually prepare sound for their films by recording the sound on tapes and then transferring these tape tracks to separate sound rolls of either 16mm optical or magnetic perforated sound film. The film sound tracks are then cut and spliced into a worktrack that conforms with the picture workprint; the worktrack is marked for special effects; and film leaders are attached, labeled with the usual information (head, title, producer, type of film, etc.), and marked for sync, re-recording, or mixing. Then the A&B picture rolls are conformed to the picture workprint, and marked in sync for printing.

In preparing and marking the sound roll for sync, there are two basic things you must know:* (1) the terminology for correctly labeling the sync mark or marks for printing and (2) the principle of the sound advance that is made for printing sound and picture onto one film (the answer print or, later, the release print). Let us take



A Picture aperture and picture frame pull-down

B Lower loop — helps to absorb stop-and-go shock

C Sprocketed wheel — drives film and helps to absorb shock

D Dampening rollers — smooth out film movement and keep down flutter and wow

E Sound drum — contains either a light source to read the optical track or, on some projectors, a magnetic pickup head that reproduces magnetic sound stripe (the drum is connected to a well-balanced flywheel, which provides a final smoothing of the film movement)

F Photo-electric cell — converts light modulations of the optical sound track into electrical energy that, when amplified, becomes audible

Figure B-1. A Typical Sound Projector (Showing Film Path and Sound Advance)

*This material is drawn from the article "Marking 16mm Picture and Sound Sync," *Rewind*, Vol. 3, January 1961. By permission of the publisher, Deluxe General, Hollywood, Calif.

up the sound advance first. Since the 16mm projector's sound-reproducing head is 26 frames *after* (below) the picture aperture, the sound track on a 16mm print must be 26 frames *ahead* of the photo frame it is to be heard against (see Figure B-1). In other words, when the sound track is arranged in what is termed "26 frames advance," the speaker of the projector will reproduce the sound that belongs with ("is in sync with") the picture being projected on the screen.

Once you understand the need for the sound advance, marking the sound roll becomes simple. All you need do is place the edit-sync mark of the sound-roll leader at the index arrow of the first gang of the synchronizer, set the frame counter to 1, run the film to the right for 26 frames, and mark frame 26 "print-sync." When the sound roll print-sync mark is pulled-up (advanced) to the edit-sync mark on the A&B picture-roll leaders at the lab, the sound-roll leader edit-sync mark is then 26 frames ahead of the corresponding picture-roll leader edit-sync mark. However, the problem is that the novice filmmaker tends to forget which way to count. So, labs occasionally receive film with the sound-leader print-sync mark 26 frames to the tail. If sound and picture rolls were printed with these print-sync marks, the answer print would be 52 frames out of sync (26 frames for the lack of advance plus 26 frames lost in moving the sound leader print-sync mark back to the picture rolls edit-sync mark). Just remember that the print-sync mark is 26 frames to the tail (to the left) of the edit-sync mark on the sound-roll leader (see Figure B-2). Mark the sound-roll leader in edit-sync first and then in print-sync, leaving the edit-sync mark on the sound roll.

Novice filmmakers also face the problem of the wide variety of terms used by labs and film manuals. A mark of *edit-sync*, *dead-sync*, *level-sync*, or *straight-across-sync* means the same thing—that the sound rolls have been edited in a synchronizer to

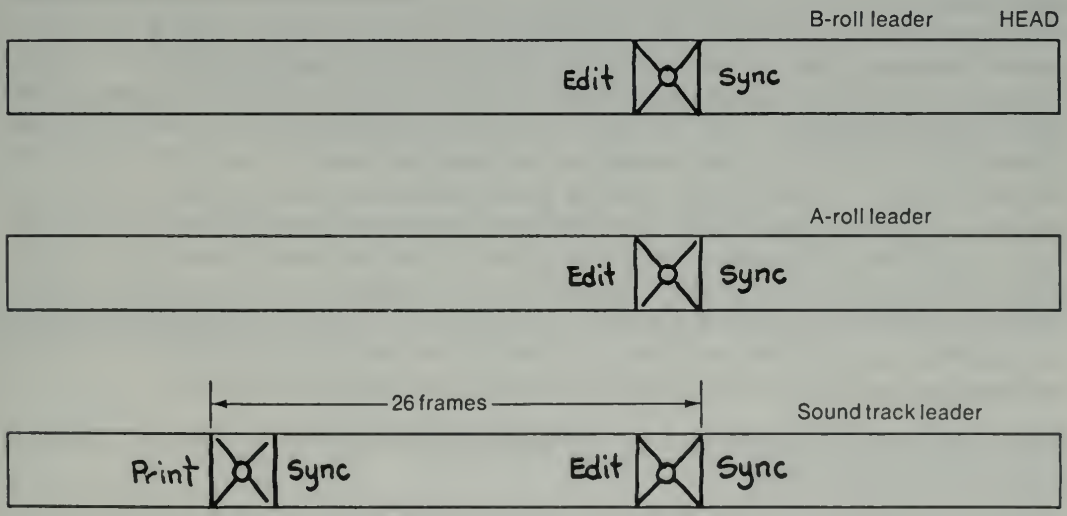


Figure B-2. Proper Position of Print-Sync Mark on Sound-Roll Leader

match the picture rolls exactly and properly and that the mark indicates that the sound roll has not been advanced for printing. Similarly, *print-sync*, *printing-sync*, *printer-sync*, *projection-sync*, *camera-sync*, and *married-sync* all mean the sound track has been advanced 26 frames for printing. Most labs will accept films cut and marked in any manner the filmmaker prefers, and they will do their best to understand and fill the order correctly. However, in the interest of clarity and good results, follow these suggestions in marking film leaders for printing sound and picture rolls:

1 Use *edit-sync* for the straight-across, picture-and-sound rolls matching frames in the synchronizer.

2 Use *print-sync* (or *printer-sync*) for frame marking the 26-frame advance for printing the sound track to the picture. Make this mark *only* on the sound-roll leader.

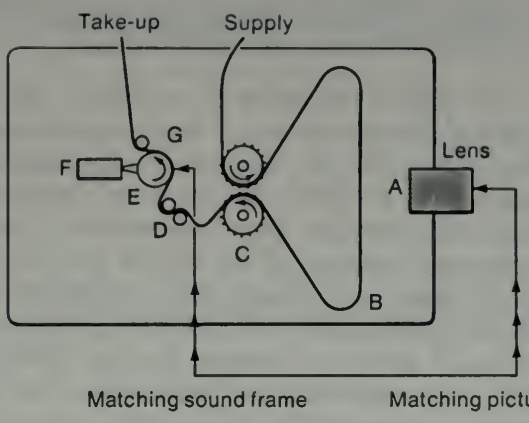
3 Whenever you are in doubt, use *only* the *edit-sync* mark on *both* the picture and sound rolls, and let the lab make the advance for the sound track and mark the print-sync frame. Be sure to advise the lab that your rolls are in edit-sync and that they should advance the track.

So far we have discussed the features and some techniques for cutting sound that is on a separate film from the picture. This process, as you know, is called double-system. This method is by far the most commonly used today. However, a great deal of film is also produced in a process known as single-system sound-on-film, in which both sound and picture are recorded on the same camera-original film. In other words, using the proper terms, with single-system synchronous sound-on-film, the sound track (**sound band**) is married to the picture film.

The sound frames that correspond, in sync, with the picture frames in this single system are positioned 26 or 28 frames ahead of that picture frame—26 frames for optically recorded sound and 28 frames for magnetically recorded sound (**magnetic sound stripe**). The reason for this separation is a mechanical one: Because the action of the motion-picture camera is intermittent, pulling down one frame at a time for picture exposure, the action must be altered below the camera shutter to record the sound in a smooth continuous movement. This smoothing action is accomplished with a series of devices. First, the film is formed into a loop at the top and the bottom of the picture gate, and this looping action absorbs most of the shock. Then the film is led over a continuously running sprocketed wheel and through a series of dampening rollers. And, finally, the film is led over a perfectly balanced flywheel, which keeps the flutter and wow to a minimum while the sound recording is made. Since all these devices require space in which to operate, the sound sync frame is recorded 26 or 28 frames in advance of the picture frame. The 2 additional frames for magnetic sound-stripe recording are simply the result of the magnetic recording head's being located 2 frames farther down the line (see Figure B-3).

This camera-recording system has the same sound advance as that of the sound projector (see Figure B-1).

The spatial separation of picture and sound with single-system sound-on-film presents a special problem in cutting or editing the film. You cannot cut across a picture frame without destroying the sound that belongs to a different picture frame 26 or 28 frames to the tail of that picture frame. In other words, with single-system sound-



Picture/sound separation: optical = 26 frames
magnetic = 28 frames

A Picture aperture
B Lower loop
C Sprocketed drive wheel
D Dampening rollers
E Sound drum and flywheel
F Light modulator for optical track
G Magnetic recording head (cameras may not have both optical and magnetic recording capability, but for sake of the illustration both are shown)

Figure B-3. A Typical Single-System Sound-on-Film Camera (Showing Film Path and Sound Advance)

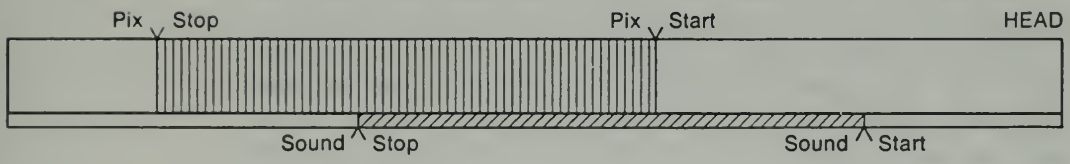


Figure B-4. Sound/Picture Separation with Single-System Sound

on-film, you cannot simply splice one scene to another, as you can with silent footage or with double-system sound.

You must do one (or a combination) of three things: (1) lift-off the sound track by re-recording (or printing, in the case of optical film) it onto a separate piece of film, so that it can be cut as with double-system (see Section B-14); (2) reposition (or displace) the magnetic sound stripe* (sound band) to an in-line, edit-sync position with the picture, so that the picture can be cut straight across (see Section B-15);

*Unfortunately, this can't be done with optical sound track; it is a photographic process and cannot be moved. However, use method 1 for optical track.

or (3) live with the separation, cutting the film as well as you can and adjusting to or disguising the loss of sound frames (see Section B-16).

Double-system sound is, of course, much easier to work with, but there are several reasons why you would want to shoot and/or cut single-system sound-on-film. One reason for cutting this film could be that you want to re-edit a release print or remove some footage from a release print. A reason for shooting single-system film is that it is less costly and simpler (and therefore more economical). Still another reason could be that the only equipment available at the time is the single-system camera and recording gear. Television news cameramen often use single-system for the first two reasons and, because of the limited time factor in getting the film ready for the newscast, rely on method 3 above for cutting the film. Whatever the reason, you must cut that footage into a meaningful and satisfactory film. In sections B-14, B-15, and B-16, we will explore some of the methods and techniques for cutting, re-recording, or modifying single-system sound-on-film.

1. Transferring Sound to Perforated Film (Non-sync)

Purpose To provide a cuttable track form that can be matched to the workprint.

Form Completed Final Scene List.

In order to cut non-sync sound (music, sound effects, narration) in relative sync with the visuals, you must first have all the sounds that you need on 16mm perforated magnetic or optical film. This allows the various sounds to be laid down and cut on a **synchronizer** (see page 11) in proper frame-to-frame relationship with the corresponding pictures. As we noted earlier, a synchronizer requires that both workprint and sound track be on perforated film.

Perhaps the easiest method for working with non-sync sound is to record or transfer your sound onto ¼-inch tape rather than directly onto 16mm film. This allows you to experiment with and pre-edit your sound to fit the pace and feeling of the picture. However, you must exercise caution in following this procedure. You are adding one more sound generation to the sound-recording process, and it is easy to introduce distortion into your track. On both the tape and the film, it is important to treat each "like" sound (music, effects, narration) as a separate track, since having each sound on a separate track allows more flexibility in sound mixing (sound dissolves, or sound over sound, for example). Also, if you are using a ¼-inch tape recorder that records in both directions (a half-track machine) or on more than one channel (a stereo machine), record only on one edge of the tape. When you record on more than one edge (both directions or more than one stereo channel), you can't cut one sound without ruining another, since they are both on the same tape.

Step 1 Using the footage and time information, gathered from the workprint and cataloged on the Final Scene List (page 35), roughly time out each sound scene on the tape to fit its appropriate picture scene. Assemble the sound tracks into workprint screen order, leaving plenty of heads and tails on each sound scene.

Step 2 You may want to run each rough-cut tape scene with the projected picture several times in order to check the suitability and the timing of the sound to the visuals. To do this, you may have to pace the sound tapes to the picture, by stopping the recorder when the sound runs longer than the picture or stopping the projector when the picture runs longer than the sound. When you are satisfied with the tapes, splice them together into separate tracks for each type of sound. The above technique should be used only for non-sync sound; for the procedures to sync and cut dialog or other sync sound, see Section B-6.

Step 3 You are now ready to transfer the tape tracks to magnetic or optical film. To save time (and quite possibly money), splice your assembled ¼-inch tapes together onto reels in lengths (or times) that will match a standard roll of magnetic or optical film stock. This procedure saves the time wasted by having to rethread either the tape recorder or the film recorder, because one runs out of stock before the other. The standard roll of magnetic film is 1,200 feet in length (33 minutes in time), and the standard roll of optical film stock is 1,000 feet in length (27 minutes in time). The playing time of ¼-inch tape depends on its thickness and the speed at which it was recorded. Check the carton in which the tape was packed for the running time at various footage lengths and recording speeds. The process of sound transfer is beyond the scope of this book. If you lack the proper equipment, your lab can provide this service and many other sound-process services.

Step 4 Before you start cutting the transferred film tracks in sync with the workprint, first splice an equal amount of leader onto all the tracks, making these leaders the same length as the workprint picture leader (see Section B-4 for a full description of sound-roll leader preparation). These leaders, called working leaders, are spliced to the film tracks as a convenience in threading the tracks through the various editing machines (synchronizers, projectors, etc.) The working leaders will not be put into sync with the workprint leader until all the sound scenes in the tracks are cut to match the workprint picture scenes.

2. Matching Sound Tracks to Workprint (Non-sync)

Purpose To provide procedures for finding, marking, and matching the sound track to the workprint.

Forms Camera Log and Completed Final Scene List.

You must now find the matching points of sound and picture (a technique called **spotting**) and mark these two films in such a way that will allow you to cut them to the exact frame-to-frame relationship that you want. This is a cut-and-trim procedure that will take your sound and picture relationship from the **rough-cut** stage to a **fine-cut** stage. This procedure can be done in two ways:

1. Read the sound scene on a sound reader, spot and mark the heads and tails of each sound scene at the appropriate points on the track (see Figure B-5 and Table B-1 for suggested markings). Then run both picture workprint and the sound track in the synchronizer, matching the marks and making any corrections needed.
2. Run the sound track and the workprint on a Moviola or a synchronizer that is equipped with a sound-reading or sound pickup head (see the list of editing tools, Appendix B). This method allows you to spot and to do minor corrections in your marking at the same time. See also Section B-10 for suggested markings on the Audio Cue Sheet and workprint for final sound mix.

Suggested Marking for Sound Track and Workprint

The *T*-mark should be used in marking the cutting points between the sound track and the workprint. Place the crossbar on the *T* on the frame to be cut, with the tail of the *T* pointing to the film piece to be cut out, as indicated in Figure B-5. Both these marks and the suggested identification marks in Table B-1 should be made by using a yellow felt-tip pen (or a number-2 lead pencil) on the

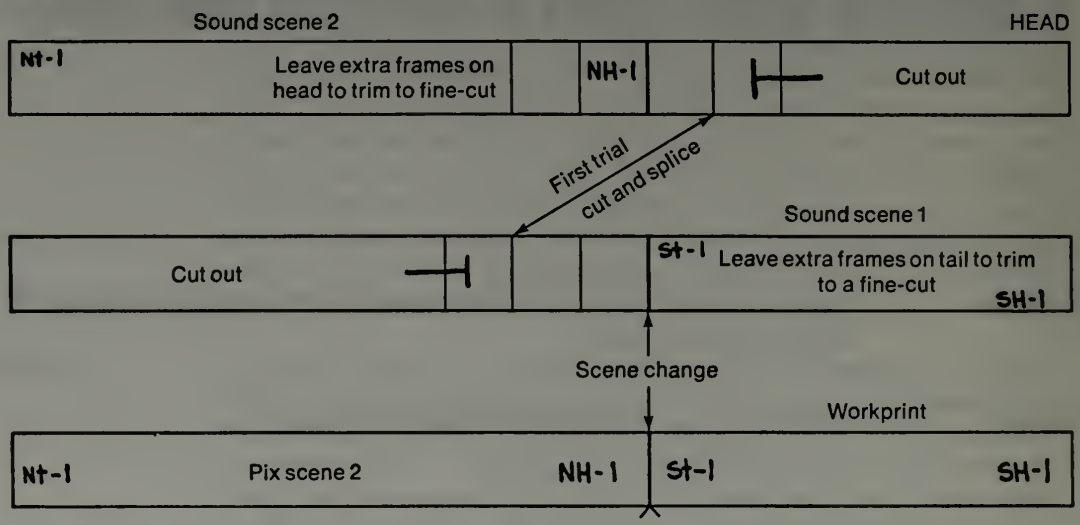


Figure B-5. Placing Marks on Track and on Workprint

sound track and a yellow grease pencil (which may be erased) on the workprint. Do not use a grease pencil on any sound film or tape; the grease clogs the playback head of the recorder, resulting in poor sound reproduction.

In addition to the *T*-marks, which indicate the sync or cutting points, you should also identify each sound scene with the type of sound and the scene number that the sound scene represents. These markings should also be placed on the appropriate head leader of each track. These markings are indicated in Table B-1.

Table B-1. Suggested Identification Marks for Sound Track

Sound	Leader Marks		Scene Number Marks	
	Head	Tail	Head	Tail
Dialog	DH	DT	DH-1, -2, etc.	DT-1, -2, etc.
Music	MH	MT	MH-1, etc.	MT-1, etc.
Narration	NH	NT	NH-1, etc.	NT-1, etc.
Sound Effect	SH	ST	SH-1, etc.	ST-1, etc.

Cutting the Sound Track to Match the Workprint

Once your sound track and workprint are marked, you can proceed to cut and trim your track to match the workprint. This should be done in steps, so as not to cut into usable sound and to be sure that you are cutting what you intended to cut. Here are a few suggestions:

1 Use caution in cutting (or marking) any continuous sound, such as music. Be sure you don't "bite off" the sound too abruptly.

2 If you plan any sound fades, dissolves, or other special effects, be certain to leave sufficient footage on the head and tail of these sound scenes to allow for the effect to be made in the final **mixing** operation. Mark these effects as you did on the workprint (see Section A-6, page 29).

3 Mark both the head and the tail of the sound scene cuts before going on to the next cut, especially on the long scenes. Most mistakes in sound cutting are made because the cutter forgot where he intended to cut the track or because he simply forgot to mark both head and tail cutting points for that scene.

4 Make all sound-track cuts and splices on a diagonal-cut splicing block or tape splicer (see Section B-3); this lessens the chance of **blooping.**

5 Align the intended cut in the splicer by overlapping the head *T*-mark of the incoming sound scene on to the tail *T*-mark of the outgoing sound scene; then make the cut and splice on the base side of the film.

6 Save and identify any **outs** (trims), and file these away for possible future use.

7 Project each trial cut in **interlock**, to check timing and play of picture and sound.

As in cutting the rough-cut workprint into a fine-cut, each sound cut requires your own editorial decision, and each film is an individual editing project requiring its own pace, movement, continuity and effects. Work slowly and use your imagination.

3. Splicing and Deblooping Sound Tracks

Purpose

To discuss some techniques used in splicing and deblooping sound tracks.

Splices in magnetic sound films are better made on a diagonal-cut splicer, since a diagonal cut reduces the actual face of the splice as it crosses the magnetic pickup head and minimizes chances of **blooping** in the sound track. Any tape or guillotine splicer that will make a diagonal splice can be used with a magnetic track. Do *not* use an overlap-cement splicer on magnetic film, however; the cement may dissolve the oxide coating off the film base, leaving you with a nasty hole in your sound track. Do not use tape on optical track; the tape may collect dirt and cause a "whoosh" sound. On optical track it is best to make an overlap-cement splice. All types of splicers tend to leave blooping, so it is better, when time permits, to make the splices by hand, using pressure-sensitive tape and working on a splicing block (such as the *Ediquip-1060*) with sprocket-hole registration pins and a diagonal cutting slot. A quick tape splice can also be made free hand. Whichever method you use to splice sound track, make certain that the splice is strong and clean and that the sprocket holes are clear and will pass through the necessary equipment. If sprocket holes are clogged, use an X-acto knife with a number-11 blade or a very sharp razor blade to clean them. The following procedure should be used with both freehand and splicing-block methods.

Step 1

After you have marked the frame you want to cut (remember that you will lose half the frame), mark this frame with a slanted line (/) between the sprocket holes. This mark should be made on both the *T*-marked tail frame of the outgoing sound and on the *T*-marked head frame of the incoming sound (see Figure B-6). Sound does not always start or end exactly on a frame-line, but don't worry about precision—simply mark as close as possible to the head and tail of the sound.

Step 2

Overlap the two slanted-line marks, being careful to align the sprocket holes on either side of the slanted line. Cut (with non-magnetic scissors or demagnetized razor blades) along the slanted line

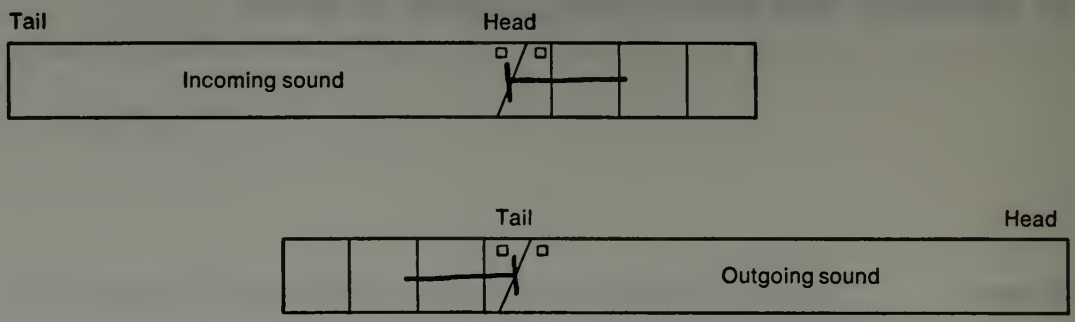


Figure B-6. Marking Sound Track for a Splice

and across the two tracks so that the cut will fall between the sprocket holes (see Figure B-7). Use only non-magnetic tools on magnetic film. If tools are made of steel, degauss (demagnetize) them daily (see page 179).

Step 3

You now have two matched diagonal cuts (see Figure B-8). Turn the track so that the base side is up, and place the two cut ends together on the splicing block. Apply pressure-sensitive adhesive tape to the base side of the track.* Apply the tape *across* the track, not lengthwise, and trim any excess tape on both sides of the cut.

If you do not have a splicing block with a diagonal cutting slot, a handy device for holding the two cut ends of the track while you apply the splicing tape can be made from a small, smooth block of wood with ½-inch *double-stick tape* attached to one side. Using the block as a work surface, lightly press the two aligned track ends onto the tape; it holds the ends firmly, and the spliced track may be lifted off easily. When not in use, keep the block covered with wax paper to protect the tape surface.

Any splice in sound track is likely to need deblooping. You can debloop a magnetic track with a handy gadget called a *magnetic erasing pencil.* This pencil has a ¼-inch magnetic all-active tip and can remove a syllable, part of a word, or a bloop from a magnetic track. Practice on a scrap piece of track before attempting to use the pencil on your production track.

To debloop an **optical track**, you must either paint over or punch out the splices in the track area. For negative tracks, deblooping

*Though it is better to use Presstapes, you can also use other splicing tapes that are approximately 7/32 inches wide.

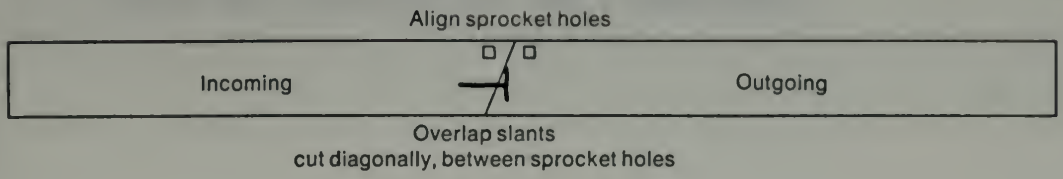


Figure B-7. Overlap for Cutting Sound Track

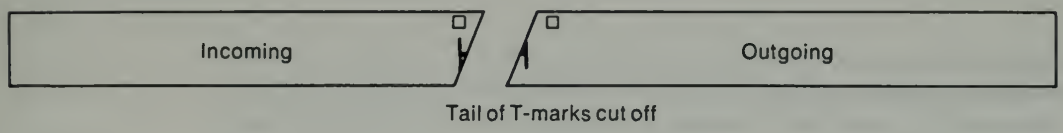


Figure B-8. Diagonally Cut Sound Tracks

Figure B-9. Deblooping Optical Track

is done by punching out the splice with a special bloop punch. Positive tracks are deblooped by painting a half-diamond over the splice with a special blooping ink (see Figure B-9).

In modern re-recording systems, automatic deblooping circuitry is often employed. This method literally disconnects the preamplifier during the interval that the splice passes the pickup head or scanning beam. The disconnection is effected by a micro-switch that is opened mechanically as the film, appropriately punched, passes by. Check with your lab; if they have this equipment, it can save a lot of your time.

4. Preparing Leaders for Re-recording

Purpose

To explain the preparation of sound-track leaders for use in re-recording and final mixing.

The first thing you must do is attach standard head and tail leaders to your various sound tracks, as you did to your picture workprint (see Section A-6). This leader measures 7 feet and 28 frames between the first picture of the workprint and the edit-sync start mark, plus an additional 6 feet ahead of the sync start mark for threading purposes. You may wonder why there are 7 feet and 28 frames of leader separating the first picture and the sync **start mark**. This is a technical requirement of the sound **dubbers** when they are put into **interlock** (all machines start in sync, run in sync, and stop in sync) with the projector. The physical mass (film, reels, dampening devices on the dubbers and projectors) requires anywhere from 2 to 5 feet of film to run through the dubbers and the projector before the machines are operating smoothly enough to reproduce or record good sound. It also allows at least 2 feet of musical introduction before the first picture. However, you may add even more footage for music (or other sound) introduction, but this music or sound will play over a dark screen. Leaders for all sound tracks must be the same length as the workprint leader and have the same sync start mark in edit-sync.

Step 1

Begin the preparation of your sound-track leaders by placing your workprint with the first picture frame (or title frame) at the index arrow of the first gang of the synchronizer. Lock the synchronizer.

Step 2

Place your first track with the matching frame (sync frame) at the index arrow of the second gang.

Step 3

Place the second track on third gang in edit-sync with the others (continue in this way until all your tracks are on the synchronizer). If the head leaders on any of your sound tracks are shorter than the workprint leader, add sufficient footage to your sound-track leaders to bring them to the same length. Follow the same procedure for the tail leaders.

CAUTION. *If you use old picture footage or positive print stock for leader on magnetic track, it is recommended that you splice the base side of the scrap stock to the base side of the magnetic track. This will place the base side of the scrap stock in the same position as the oxide side of the magnetic track. The splice is made this way in order to prevent the scrap-stock emulsion (which is very soft) from clogging the playback heads of the dubbers.*

Step 4

After all the sound tracks are mounted in edit-sync and the leaders have been brought to equal length, roll the films so that the first picture frame is again at the index arrow. Lock the synchronizer, and set the footage and frame counters to zero (we are going to count backwards). Unlock the synchronizer, and roll the films to the left until you come to the edit-sync mark on the head leader of the workprint. Lock the synchronizer. Check the footage counter; it should read 9,993 (or 7 feet subtracted from 10,000) and the frame counter should read 12 (or 28 frames subtracted from 40); this is the technique used to count backwards, as outlined in Using the Gang Synchronizer, Section A-2. In other words, the first picture should be 7 feet and 28 frames from the edit-sync mark. If your edit-sync mark (also called, at this point, the sync start mark) is not this distance from the first picture, change the mark on the workprint to comply to this measurement. Next, mark all the sound track leaders with an "X" in the frame that matches the edit-sync mark of the workprint.

Step 5

Since with magnetic film these edit-sync (sync-start) marks will not transfer in the re-recording process, you must also attach a **sync-beep** tape or cut in a full frame of previously recorded magnetic film to mark or replace the head-leader frame that is exactly 80 frames before the first sound frame. This sound mark should be placed on all sound tracks. The reason for the exact position is that this frame becomes the projection sound-cue mark used in theaters and on television. Mark the corresponding frame on the workprint so that the master-recording sound track (mixed from the many tracks) can be sync'd with the workprint.

To cut in the tone frame of magnetic film, unlock the synchronizer and roll the films to the right until you reach the first sound frame (or if picture precedes sound, the first picture frame). Count backwards (move the film to the left) for 80 frames (2 feet). Lock the synchronizer. On each track mark the frame that is at the index arrow with an "X"; then mark the left and the right frame-line of each *X*'d frame. Unlock the synchronizer and roll the films to the left to gain working room. Now, using a splicing block with a diagonal cut, splice in the full frame of tone to replace the *X*'d frame on each track. Remember to apply the splicing tape on the base side of the track. Splicing a tone frame on each sound track provides a check on the interlock sync of the dubbers. If they are in-sync and the tracks are in-sync, you will hear only one tone;

if either the dubbers or the tracks are out-of-sync, you will hear more than one tone. Optical sound film may be marked for sync-tone transfer by painting a small black square (using a felt-tip pen) in the appropriate frame. This mark should be made in the track-band area.

Step 6

When you finally thread your magnetic film on the master recorder (the recording machine that makes the final record of your combined sound tracks) to prepare for the re-recording or mixing session, leave at least 10 feet of clean (**unmodulated**) film at the head for use as a leader on the master sound roll. This is standard procedure for most labs that offer re-recording and mixing services. It saves you the step of splicing on a leader. They will also mark the edit-sync (or start mark) point on the master sound roll and the workprint, usually with a piece of white tape laid over the matching frame of each. This gives you two sync check points: (1) the transferred sync-tone (a check on your sync'ing procedure and (2) the start mark (a check on the performance of the dubbing machinery).

5. Synchronizing and Coding the Dailies (Sync)

Purpose To prepare synchronous picture and sound-track dailies for cutting into the workprint.

Form Cutting Log.

When you shoot film that includes sync sound (lip-sync dialog, for example), dailies (rushes) should be made of both the camera-original film and the original sound film. These dailies must be coded to match the camera-original film, so that all four film pieces will have the same numbering system (**latent-image numbers** or **ink-printed numbers**), which will be in edit-sync on all the films. Your lab can provide this service, if you send them the camera-original stock and the original sync-recording stock (either perforated film or sync-pulse tape). Instruct them (1) to process the camera-original stock, (2) to daily print that with print-through latent-image numbers, (3) to resolve the sync-pulse tape onto perforated magnetic (or optical) film, (4) to daily print that sound film (actually, this is not a print process but a sound transfer from one film to another film), or, if your sound original is on perforated film, (5) to make a daily print of that, (6) to sync the picture and sound dailies, and finally (7) to code all four films (camera-original and its daily sound original and its daily) with the same numbers in edit-sync. Or you can do the syncing and coding yourself by following instructions (1) through (5) above and proceeding through the steps outlined in this section under Syncing the Dailies.

Suggestions for Finding Sync Points

1 The **clapboard** (**slateboard**), which is held before the camera to identify the scene, is also used to provide sync points between the picture and sound films (or tape). A movable arm, hinged to the top or the bottom of the slateboard is quickly banged onto the slateboard producing a loud "clap," at the same time bringing the arm into a definite position that aligns a pattern of black and white stripes on both the arm and on the slateboard. This pattern

of stripes gives the picture sync point, and the clap (also called a **modulation**) gives the sound sync point. By putting these points together in edit-sync, the sync between the picture and sound is established.

2 Any object that can produce a simultaneous visual and aural occurrence, can be used to establish sync: (a) a handclap in front of the camera and microphone, (b) a cup quickly brought down on a table in the scene, (c) a door closed sharply in a scene, etc.

3 A relatively new system for establishing sync, which is quickly replacing the clapboard, is the automatic clapstick (electronic clapper), which is an electronic device built into some models of cameras and recorders. These devices automatically fog several frames (usually seven) of the camera-original film and implant a tone on the sound film or tape. This system can also be designed to record the successive shot/take numbers of the scene. To establish sync between the picture and sound, you first find the fourth fully fogged frame of the picture (as the fogging, or blooping, lamp in the camera is turned off by the circuit, each succeeding frame becomes less fogged) and put that frame in edit-sync with the first frame of tone on the sound film. Now, there are conditions (such as weak batteries or improperly tuned circuits) that will cause these sync points to shift one or two frames in relationship to each other. However, the sync can be reestablished by interlock viewing or projection.

Syncing the Dailies

Step 1 Starting at the head of the first scene of the original sound film and using a sound reader or the sound pick-up head on the **synchronizer**, find the sync-modulation point (clap, tone, etc.) and place this frame oxide up at the index arrow of the third gang of the synchronizer. Lock the synchronizer. Find the same sync frame (clap, tone, etc.) of the same shot/take on the sound film daily, and place it oxide up at the index arrow of the second gang of the synchronizer. Place the picture daily print emulsion down, with the visual sync point (clapstick pattern, fogged frame, etc.) at the index arrow of the first gang on the synchronizer. Mark each sync-point frame with an "X" at the index arrow (see Figure B-10). The reason we use the original sound film and the picture daily print, but not the camera-original film, is that the picture daily print is numbered the same as the camera-original (which should be filed away) and the original sound film must be numbered to conform to the camera-original film.

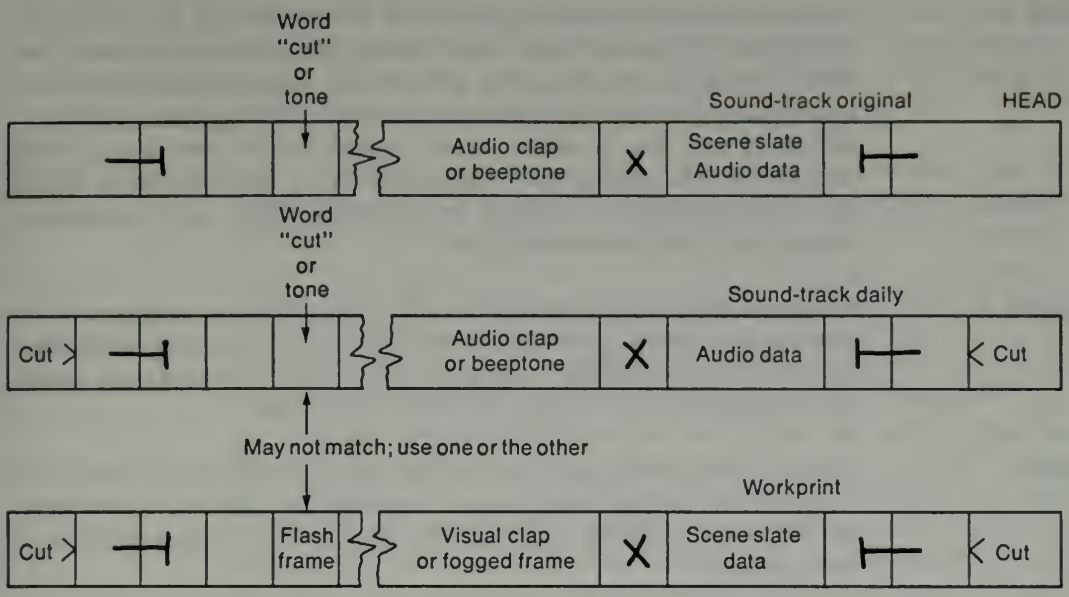


Figure B-10. Daily Sync Marks and Cuts at Head and Tail

Step 2 Unlock the synchronizer and roll the films to the left for a foot (this will leave a foot of slateboard identification of the scene at the head of the films). Lock the synchronizer. Now mark (with the *T*, using a felt-tip pen) picture and sound films at the index arrow. Unlock the synchronizer and roll the films to the right to gain working room; then lock the synchronizer and cut the sound film daily and the picture daily one frame to the right of the *T*-marked frame. Leave the original sound film intact (see Figure B-10).

Step 3 Unlock the synchronizer and roll the films to the right until the tail sync points are reached. You can establish the tail sync points by (1) spotting the word "cut" (if called out by the film director) on the sound film, (2) a tail sync modulation, which is implanted on the sound film at the end of a take by some recorders, or (3) the flash frame in the picture which is created by the stopped shutter. You should check both sound and picture films to be certain that you have found the correct tail sync points and thus avoid cutting into valuable frames. Roll the films to the right about 6 inches beyond the tail sync points, lock the synchronizer, and mark (with *T* and felt-tip pen) the matching frames at the index arrow (see Figure B-10). Cut the picture and sound dailies one frame to the left of these marks. Leave the sound original film intact.

Step 4 Remove the picture and sound daily films from the synchronizer. Using the T-marks as sync-start points, view or project these two films in interlock to check the sync. Make any adjustments needed and return the films to the synchronizer, placing the *T*-marks in edit-sync with the *T*-marks on the original sound film. If you have made any corrections to the sync points on the daily films, make the same corrections on the original sound film, so the syncing and coding will remain accurate.

Step 5 Repeat the above procedure for the second scene, and for all the remaining scenes of the daily rolls. Before coding a scene, be sure to run an interlock viewing or projection on each sync'd daily scene and make any corrections needed on all films.

Step 6 Unlock the synchronizer and roll the films to the left until the *head T*-marks are at the index arrow. Proceed to code all three films, starting with the head edge-number and following the method outlined below.

Identifying Sound Tracks (Coding or Edge-Numbering)

In the case of irreplaceable sound tracks, such as lip-sync dialog, live recordings, etc., it is advisable to make an in-sync sound track daily (or worktrack) directly from the original track and to use this daily as a cutting copy. If you make a sound daily, be certain to code or edge-number both the original track and the daily so that you will be able to conform the original track to the edited worktrack easily. The laboratory will provide this service, or you can do it on a synchronizer. To do this yourself, follow these steps:

For Non-sync Coding:

Step 1 Using a Moviola editing machine or a sound pickup head on the synchronizer (see the list of editing tools, Appendix B), spot the first frame of sound on the head of the original track (if there is a beep tone or a clap, use that frame) and place this frame (or the *X*-marked frame) oxide up at the index arrow of the second gang of the synchronizer. Lock the synchronizer and set the footage counter to zero and the frame counter to 1.

Step 2 Carefully spot the matching frame on the worktrack and place this frame, oxide up, at the index arrow of the first gang of the synchronizer.

Step 3 Using a felt-tip pen, or a number-2 pencil, mark both tracks with the shot/take numbers of that scene and with a code representing

the type of sound that is on the track and a letter denoting the head or tail position of the sound—for example, *SH* ("sound effects, head"). (See Table B-1, Section B-2.) In addition, write the letter "W" (*SHW*) on the worktrack.

Step 4 Now unlock the synchronizer and roll both films to the right 40 frames (from 1 to 0 on the frame counter), or, if you want a closer coding system, use frame 1 to 20. This doubles the numbering sequence and will cut down the chance of cutting an unnumbered scene. Mark the first code number, which in this case will be 1, on both tracks between the perforations. Continue this process, advancing the footage by either 20 or 40 frames until the tracks are completely coded. Check the footage counter now and then to verify the correct code number, and make all marks opposite the index arrow of the synchronizer (see Figure B-11). When using the 20-frame count code number, the footage counter will read half of the actual numbers marked (for example, 6–20 frame advances will read 3 feet on the counter). If you have more than one reel or roll of tracks, simply prefix the code number of each reel with *A*, *B*, *C*, etc.

For Sync Coding:

Instead of a separate numbering system, you can, if you want, use the footage edge-numbers from the matching scene of the picture workprint (and, consequently, the camera-original film). Even though these are a long series of numbers and require a lot of marking, they provide a direct correlation between picture and sound scene. Place the picture workprint on the third gang of the synchronizer in edit-sync with the original track and the worktrack; then record the picture workprint edge-numbers on the matching frames of the original and worktrack, as indicated in Figure B-11.

Step 5 When the syncing and coding is completed, file the original sound film with the camera-original film of that scene (see Section A-4, Organizing Original for Cutting Workprint Footage).

Step 6 Proceed to break down the sync'd dailies into those shot/takes wanted for the workprint assembly (see Section A-6, Cutting the Workprint).

However, before you start your workprint assembly, we will digress a moment to discuss two of several editorial methods of determining how you should combine your sound and picture. These methods, although primarily mechanical, require a great deal of editorial decision on the part of the film cutter. For example: How does the scene play with this or that sound? Should the dialog of character 1 be over the picture of character 2? Does the master scene tell the story better than a series of medium or close-up shots? Will

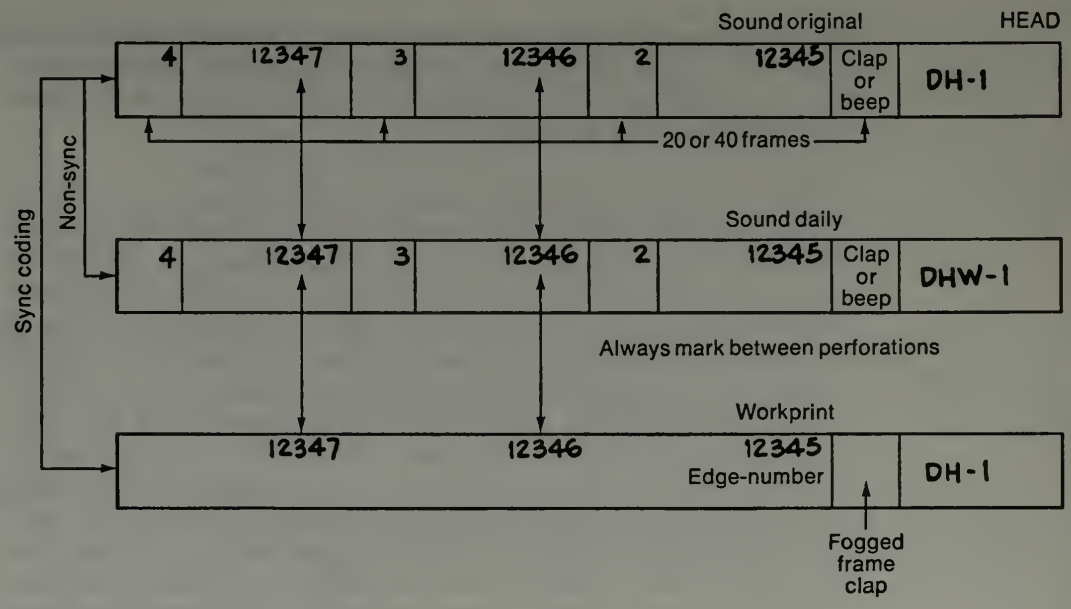


Figure B-11. Coding and Edge-numbering Sound Tracks

that cutaway and cutback combination require special handling of the dialog? Your decisions about these and other editorial problems can be made before, during, or after the assembly of the picture dailies into a rough-cut workprint. This is why there are two basic methods (and combinations of both) for approaching these problems: (1) building up the scenes into a sequence using both sync'd picture and sound dailies simultaneously or (2) cutting only the picture dailies into a rough-cut assembled workprint and then matching the sync'd sound dailies to the workprint. The first method may be quicker and more versatile, but the novice film cutter may have difficulty in visualizing the continuity in the workprint. For this reason, and for the sake of simplicity, we will follow the second method, with these words of warning: Keep your first workprint assembly loose. This is the natural cutting progression anyway—trimming the rough-cut down into the fine-cut. This rough-cut assembly allows you to mark and try the picture and sound combination in many ways before actually cutting the film. So, for all the techniques in Section B-6, Marking and Cutting Dialog Track, we will assume that the workprint is rough-cut and assembled.

6. Marking and Cutting Dialog Track (Sync)

Purpose To provide procedures for cutting the sync'd dailies into the workprint.

Form Cutting Log.

The cutting of lip-sync dialog track involving cutaways, inserts, intercuts, or transitions of both sound and picture is really no more difficult than syncing the dailies between picture and sound. Just keep in mind that the coding of the picture and sound films is your reference to the sync of these two or more films. Keep that coding in order and, no matter where you interrupt the sound track or picture, you can come back to the correct sync. Here are some other useful suggestions for all dialog track marking and cutting:

1 All marking of tracks and pictures must be done at the index arrow on the synchronizer; and after the working head leaders have been attached to the first scene, the cutting and splicing should be done on the left side of the synchronizer to preserve sync in the assembled portion of the films.

2 Even though you can always return to sync by matching the code numbers of track and picture, it is easy to forget where you planned to cut, so you should always mark your intended cuts with a *T*-mark at the desired frame and on all the films involved. Put the crossbar of the *T*-mark on the frame to be cut with the tail of the *T* pointing toward the film piece to be cut out (see Figure B-12).

3 The combination of code numbers and *T*-marks on the films will allow you to view the films in interlock on a Moviola or a viewer/sound reader combination. It is best to run through the entire length of a scene, sequence, or a reel, checking the corresponding code numbers, testing your sound and picture juxtapositions, and making any adjustments needed, before you start the cutting process itself. This roll-through is a pre-cutting design, which will keep you from making unnecessary mistakes and may reveal new combinations of sound and picture.

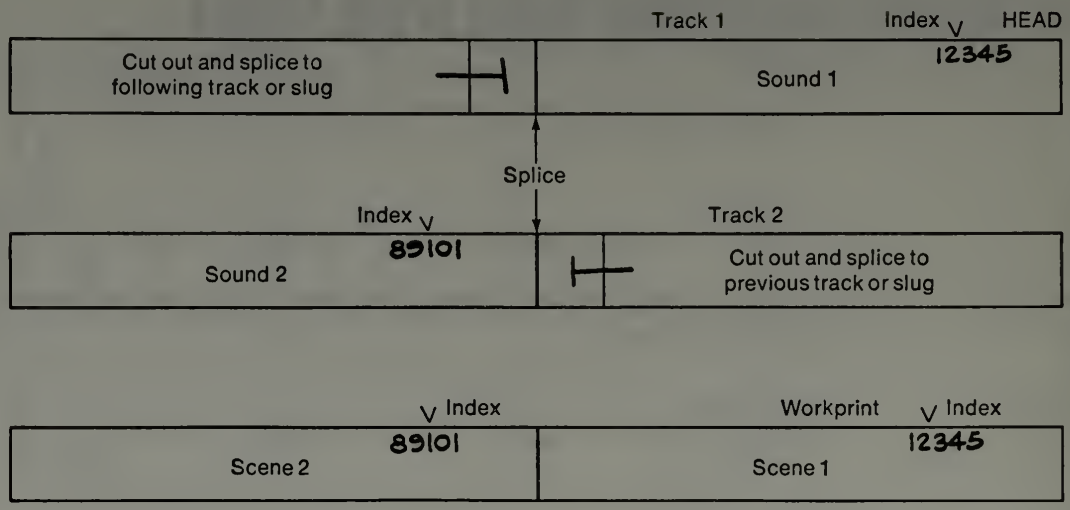


Figure B-12. T-Marking and Aligning Code Numbers

4 Record each intended cut on the Cutting Log, identifying each of these cuts by using the head code number and the shot/take number of that scene. When this form is completed, you have a sync-sound cutting script or design; and it may reveal new relationships (see Figure B-13).

5 Wherever you cut out a section of one sound track to be repositioned onto another track, you must slug that space in the assembly with single-perforated leader (clear for optical track, white for magnetic track*). This is similar to the method used in the checkerboard technique (see page 51).

6 Cut one track at a time. If you cut more than one track (without slugging it with leader or splicing it to another track), you might lose sync on one of the tracks by rolling it out of the synchronizer.

7 Use a diagonal cut and splice on sound tracks to minimize blooping. No matter which type of dialog cut you want to make, the first step is to place the workprint on the first gang of the synchronizer with the head code number at the index arrow and to place each

*White leader provides good visual contrast for identifying cuts between the track and the leader. Clear leader is a must for optical track (no sound modulation). You can use old print stock, but observe the caution on splicing outlined in Section B-4, Preparing Leaders for Re-recording.

CUTTING LOG Production No. 71-82-600 Date 2/19/72

Title Up and Down Cutter Joe Call Footage 728

	Edge No. Head	Tail	Footage/Frame Head to Tail	Shot Size	Action Direction	Shot/ Take	Scene Description
Pix	1234					5/1	Girl puts glass on table (cut)
Sound	1234					5/1	" " " " " "
Pix	5678					1/2	Door opens (cut)
Sound	"					1/2	"Gasp" from girl (cut)
Pix	91011					2/3	Girl stands up at table (cut)
Sound	"					"	" " " " " " "
Pix	1213					1/6	Man walks thru door (cut)
Sound	"					"	"I'm home, honey" (cut)
Pix	1415					1/8	Girl hides bottle of whiskey(cut)
Sound	1216					1/6	"What a day." "The old man..."

Figure B-13. Cutting Log

of the required tracks as they come into place in the assembly on successive gangs, with the corresponding code numbers in edit-sync with the workprint.

All the figures in this section illustrate dialog cutting on the scene change. This is done only for the sake of simplicity—we do not mean to imply that this is the only cut that is possible. Dialog, or any sound, can precede (or introduce) a picture cut or follow a picture cut. Use your imagination, try placing your sound in more than one position on the cut. However, in doing so, you still must match the code numbers between picture and sound films. If you want to proceed or follow the picture cut with the sound cut, leave adequate head and tail footage on the sound track; this will allow you to make any adjustments necessary.

Four Techniques of Picture and Dialog Marking and Cutting

Technique 1: Picture Cutaway with Continuing Dialog. Mark the track with perpendicular lines at the corresponding frames of the workprint cut. This helps find the cut later in conformation.

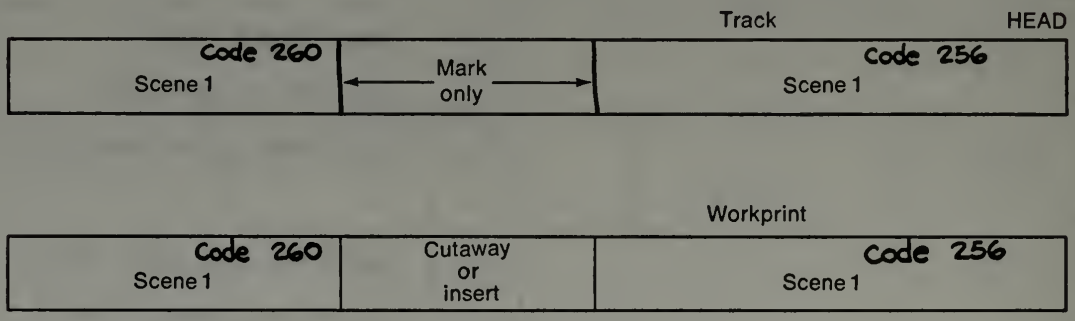


Figure B-14. Picture Cutaway

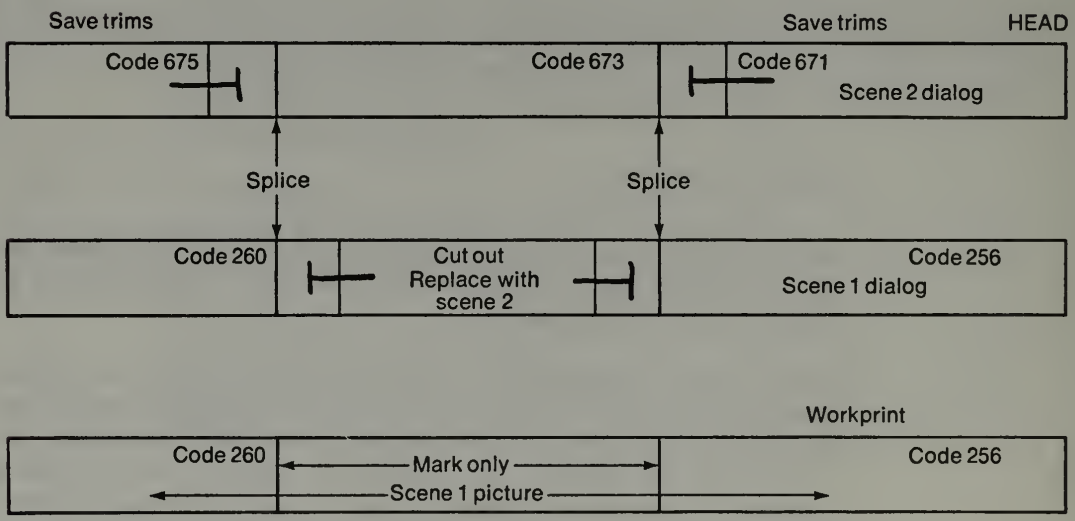


Figure B-15. Sound Cutaway

Be certain to cut out the necessary footage and frames from scene 1 of the workprint to allow for the cutaway footage. Match the code numbers for scene 1 track and scene 1 picture on both sides of the picture cutaway (Figure B-14).

Technique 2: Sound Cutaway with Continuing Picture. Check for a code number on scene 2 cut-in before cutting. If there is no code number, write in the code number plus the number of frames away from nearest the head code number. Mark the cuts on the workprint.

Cut out the necessary footage and frames from scene 1 track to allow for the cutaway footage. Match the code numbers, for scene 1 track and scene 1 picture, on both sides of the sound cutaway (Figure B-15).

Technique 3: Assembling a Sequence of Intercut Dialog and Picture Scenes. The workprint scenes have been artificially shortened to allow the illustration of several tracks marked for intercutting (Figure B-16).

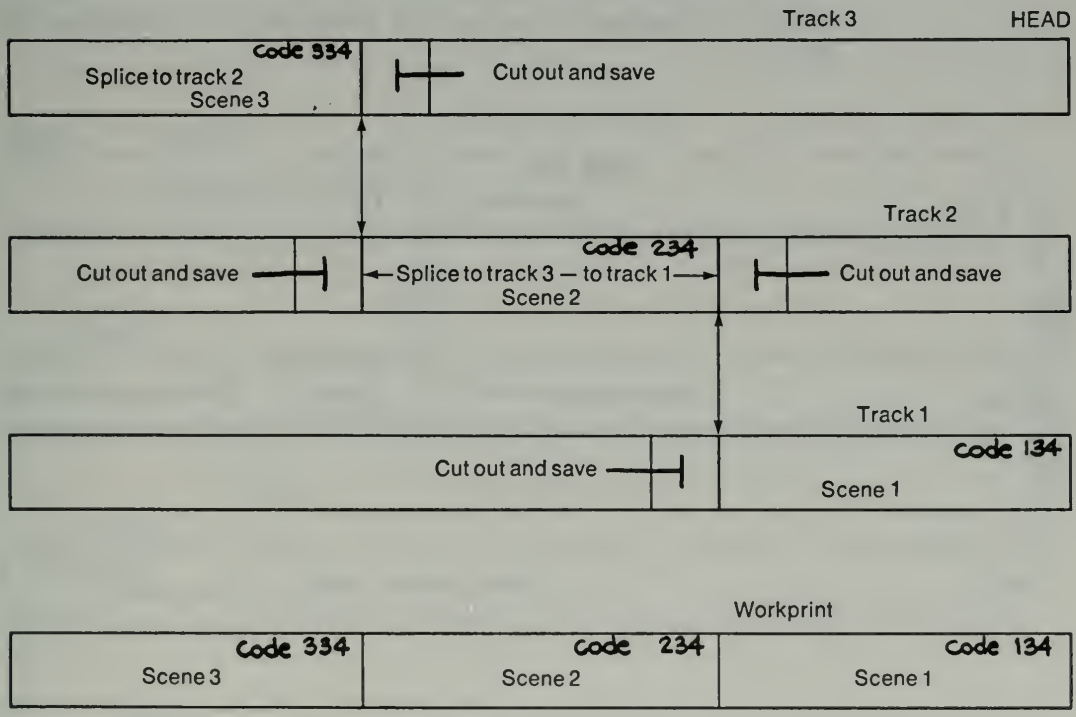


Figure B-16. Intercut Assembly

Technique 4: Picture and Sound Transitions. An excellent sound technique for transitional scenes is the use of dialog (or any sound) of one character to carry over from one location or time to another location or time (Figure B-17). This technique is both a production (filming) and a cutting design. The technique requires that, at the tail of scene 1 (in which character 1 has been on screen with dialog), the picture and dialog cut to character 2 (same location or time). Character 2 has a short on-screen speech (often a question); then while character 2 and scene 2 are still on screen, cut the dialog track back only to character 1 for a continuation of his dialog from scene 1; then cut in a close-up shot of character 1 (in scene 3), being careful not to show background. Finally, through the device of a picture dolly back or a zoom-out, we reveal character 1 in the new location or time (scene 3) speaking a continuation of the dialog from scene 1. Each of these scenes should be shot and recorded with overlapping dialog from scenes 1, 2, and 3. This will give you editorial choice in matching the cuts between each scene. In addition, the sound volume (level) and **equalization** must be matched perfectly during the re-record session, so that there will be no disturbing differences between the sound cuts. The marking of these scenes should be made on an experimental basis first, to find the best sound and picture juxtaposition to best show the effect.

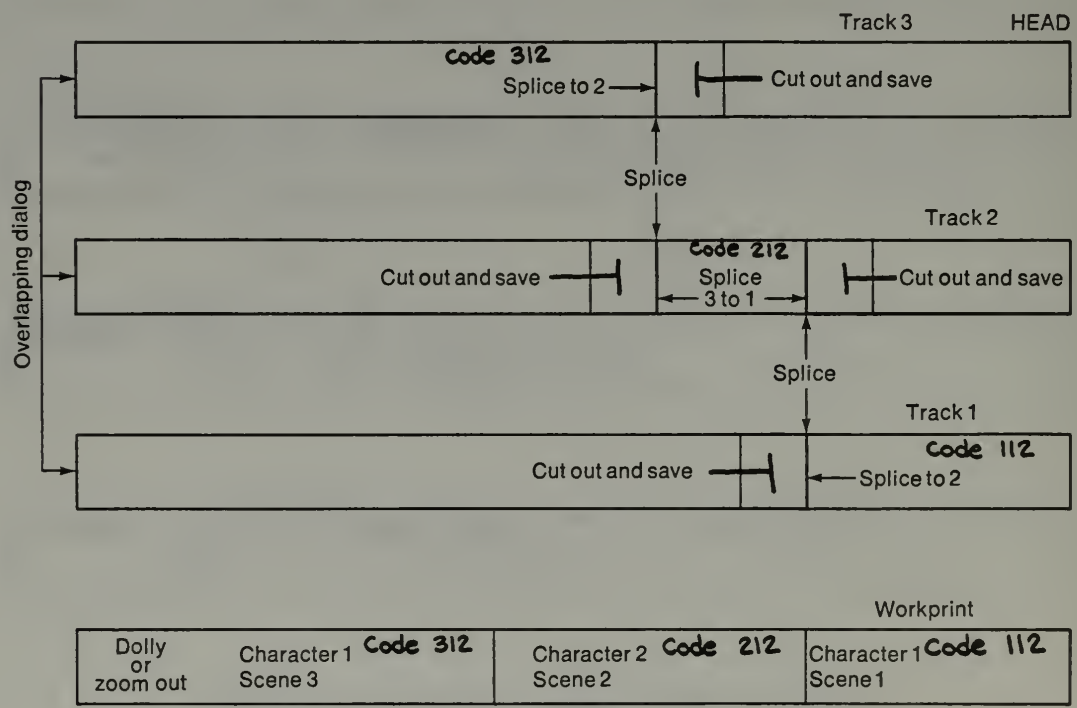


Figure B-17. Intercutting Transitional Dialog

Finally, after you are satisfied with the manner in which your picture and sound plays, you should start the process of trimming down the rough-cut assemblies into the fine-cut assembly stage. At each step in the cut-and-trim process, you must *T*-mark each new cut in the track and picture and match the code numbers between the track and the picture. Project each trial trim in interlock to give you the screen play of the new picture and sound combination. Identify and file all the trims (outs) for possible later use.

7. Constructing a Sound Loop (Non-sync)

Purpose To provide a method for continuously recuing non-sync sounds.

You should construct a sound **loop** for wild sound or musical effects that are to be used throughout a film. This technique is much easier than cuing the sound each time it is needed. You cannot use this technique, of course, with sync'd sound cues; that is, with sound effects that are specifically matched to a visual or musical action (a series of gun shots is an obvious example).

In selecting sound for looping, it is better to use sounds that do not have a definite beginning or end, like crowd noises, laughter, applause, beats, footsteps, ocean waves, and the like. Otherwise when you are **potting** in the sound, you may slightly miss the head or tail of the sound and the result will be an abrupt, choppy beginning or end of the sound effect.

Loops can be constructed of ¼-inch tape, magnetic film, or optical film. Film loops require special **loop-tree** equipment, however, and are usually used only for lip-sync playback or dubbing. In this section, we will discuss the ¼-inch tape loop.

Step 1 In constructing a ¼-inch tape loop, keep the loop as short as possible. Do not try to build a tape loop longer than 3 feet, which gives you 4.8 seconds of sound. Splicing the loop is probably the most difficult part of its construction. The splice must not produce a **bloop**, which means, first, that the splice should be made on a splicing block designed to make diagonal splices (the Editall block is a good choice). Second, make the splice across the base side of the tape, using a splicing tape and trimming it closely to the sides of the sound tape. There should be no interruption of the sound across the splice.

Step 2 Once the tape loop is spliced, it is very easy to lose track of the head or tail of the sound. So, before setting up for recording the loop onto the film sound track, test the loop on a playback recorder to determine the head position. Then, using a felt-tip pen, mark the head with an arrow denoting the direction of travel for the loop. Also write the shot-take number or some other identification on the loop.

Step 3 When you are ready to record the loop onto the film track, you must be certain that the loop will proceed through the recorder at a steady speed and without jumps or interruptions. The best way to insure this is to construct a simple loop-tree, using an empty 3-inch diameter tape reel or an 8mm 50-foot film reel that balances and weights the loop as it runs through the recorder (see Figure B-18). (This type of loop-tree can be used only on vertically mounted tape decks or recorders, of course.) Hang the reel on the tape and allow the reel to hang and spin freely; do not thread the tape across the take-up spindle of the recorder.

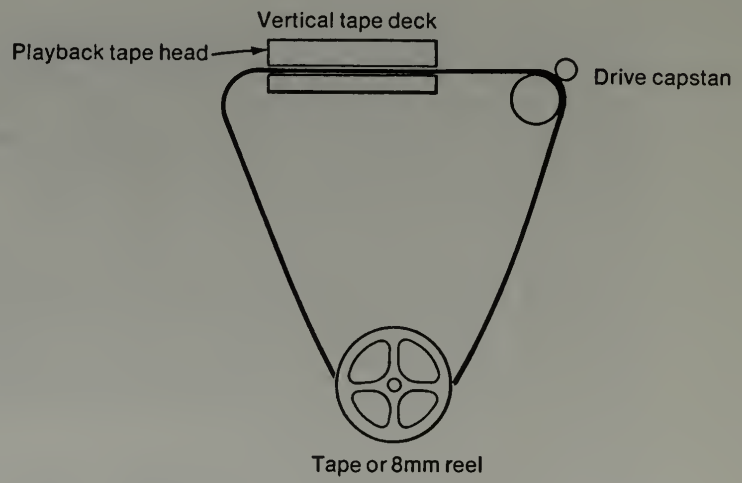


Figure B-18. Tape Loop on Machine

Step 4 The loop should be kept running through the recorder during the entire recording session.* This enables you to pot in the sound at any point you want. You can keep track of the head of the loop while it is in motion by checking the head arrow as it moves across the playback head of the recorder.

*Cartridge recorder/playback units (such as Sparta 600 R/P or MC-204) have found increasing use in professional film sound studios. They can be programmed to stop at the head of a loop or to play continuously. The cartridge used in these systems requires that the recording and playback equipment be of the same type. Before you record, check with your lab to determine whether they have these facilities.

8. Recording the Narration Track (Non-sync)

Purpose To prepare the workprint and sound track for narration recording.

Form Timing Chart.

After the workprint has been edited to the fine-cut stage, the narration script should be written and timed as closely as possible to the workprint. You are then ready to record the narration. There are two schools of thought as to the better method of doing this; we can call them (1) the *recording-wild* school and (2) the *recording-to-picture* school.

Recording Narration Wild

In this method the entire script is recorded without projecting the workprint and without too much regard to the spacing or fitting of the narration to the pictures. The delivery of the narration has to be roughly timed to the scenes, of course (using the Timing Chart and the scene length data from Final Scene List), so that when the recording is completed, the picture and the track are in rough relationship to each other. However, the narrator is spared the distraction of film or script cues; and he may, therefore, concentrate all of his attention on interpretation of the reading. This method has one main drawback: If there are scenes in which the action must fit the narration exactly, the timing of the wild narration is likely to be off.

If you use this method, there is no need for making the workprint with narration cues. You simply record the narration on tape, timing it as carefully as possible to fit the length of each scene (see Timing Chart, page 157), and then transfer the narration recording to perforated magnetic film, attach a working leader, and cut the track to fit the picture. This cutting is done on a synchronizer, following the procedures for spotting sound cues outlined in Section B-2. Whenever the narration track does not fit the timing of a scene (assuming you don't need an exact fit to scene action), you can shorten the track by cutting out silent frames or lengthen it by

adding frames of **room tone** between sentences or natural pauses. Save the silent frames you have cut out and use them for room tone. It is better to do this shortening and lengthening of the narration track scene by scene, starting at heads of the film and working to tails. This keeps the scene in sync, without disturbing the sync relationship between the other scenes.

Before you cut any scene, code that section of the sound track with the workprint edge-numbers in edit-sync. After all narration scenes are cut to a satisfactory fit, roll both the track and the workprint to the left until the head of the first narration scene is at the index arrow of the synchronizer. Check the nearest pair of edge-numbers (workprint and track code) to be sure that they match and are in edit-sync. Roll the film to the left until the sync punch mark of the workprint leader is at the index arrow of the synchronizer, and mark the matching frame of the soundtrack leader. Then run the entire film slowly to the right, checking that each edge-number pair between the workprint and sound track is in edit-sync. To check the results of your sound cutting further, run both workprint and sound track in interlock projection. This is the acid test, which will reveal corrections, if any, that need to be made. Never finalize a sound track until you have run the workprint and sound track in interlock projection.

Recording Narration to Picture

In this method, the narrator reads and records the narration (in sync) for each scene as that scene is projected, so that he can time his delivery to the scene action. If there are scenes that have to fit narration *exactly*, then clearly this method should be used. (You will probably find that a combination of both this method and the wild-narration method can be used on the same film.)

The problem with this recording-to-picture method is the narrator must be visually cued to each scene on the workprint sufficiently ahead of a narration scene sequence so that his timing and delivery will be good. To prepare the workprint with these narration cues, follow these steps:

Step 1 Break down the workprint (or a **dupe**) into easily handled scenes. Then splice 72 frames of clear leader onto the tail of each scene and loop and splice this clear leader to the head of that scene.

Step 2 Using a black grease pencil, mark the clear leader with an "X" on every *eighth* frame, counting the first frame of picture as 1 and proceeding toward the head of the leader. Stop at frame 24 and mark the remaining 48 frames of the leader with a modification of the ready-to-start mark (page 107). Now draw a slanted line between each cue mark (see Figure (B-19). These markings give the

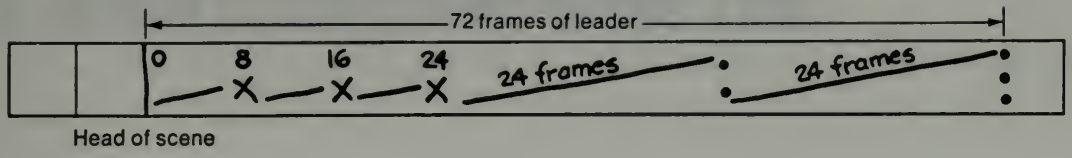


Figure B-19. Marking Workprint with Narration Cues

narrator two 1-second cues and three ⅓-second cues to start reading. Place the three dots in the gate (aperture) of the projector. This loop is run continuously through the projector. The loop construction returns the workprint to the start mark automatically. An assistant should stand by the projector to keep the film loop running smoothly.

Step 3 Make a trial run of a scene; then make a take using magnetic tape to check delivery and rough pacing. Run the tape recording with the projected workprint. Sometimes it helps to have another person cue the narrator with a series of taps on the shoulder. This allows the narrator to focus most of his attention on the script.

Step 4 Final recording for this method should be made directly onto the perforated magnetic film track, in interlock with the picture. Place a piece of white pressure-sensitive tape on the frame of magnetic film that is at the second head. This white tape and the three black dots on the workprint are the sync marks for that scene. After a good take has been recorded, punch the narration track in sync with the workprint scene and run them in interlock projection to check delivery and fit. Identify each take with a number and the head edge-number of the workprint scene.

Step 5 Reassemble all the workprint scenes into screen order, keeping the leader between each scene; then assemble the satisfactory takes of the narration track, matching the sync points of the track to the workprint. Add head and tail leaders, marking the leaders as outlined in Section B-3.

Some laboratories, with sound dubbing equipment, offer a variety of sync-recording services to the filmmaker. The latest techniques employ completely automated equipment. Check with your lab and ask for their recommendations.

Step 6 Project workprint and track in interlock to check fit sound balance and **equalization**; then prepare the track for mixing (see Section B-10). These steps in preparing narration-to-picture may seem complicated and time consuming. They are, but they are also necessary if you want the narration to fit precisely and to "orchestrate" your picture.

9. Making an Inexpensive Answer Print

Purpose

To provide an inexpensive method of producing an answer print for trial sound mixing.

Your workprint, after many projections and corrections, may be in very poor condition, with splices coming apart, sprocket holes torn, etc. If this is so, you will find it difficult to work with this damaged workprint in cutting sound and projecting for trial sound mixes. An inexpensive solution to this problem is the **dupe**-print method of making a sound answer print.

Step 1

Have your lab make a **one-light** dupe print of your workprint on single-perforated film, with a **magnetic sound stripe** applied to the base side of the perforation-free area. Be certain that you reinforce any weak splices or torn sprocket holes on the workprint before the dupe print is made. Save your workprint; you will need it for conformation of the camera-original footage.

Step 2

With this fresh, mechanically clean **striped workprint**, you can record several trial tracks, mixing and relocating sound as you want. The recording can be made on any magnetic-recording projector or on many types of sprocketed magnetic recorders.

The 1-light dupe print will cost about 7 cents per foot. Add to this cost, 2 or 3 cents per foot for the magnetic stripe, and it still represents about half the cost of a first answer print. The dupe workprint can be economical in yet another way. Since recording studios charge by the hour for the re-recording or mixing process, it benefits you not to have any mechanical delays. Torn sprocket holes or parted splices on a much used workprint can add expensive time to your sound-mixing session. With a fresh dupe workprint, on the other hand, you can concentrate all of your time on getting the best possible sound mix. Still another advantage of the striped dupe print is that you can use it over and over again in recording, juxtapositioning, and mixing your sound by simple degaussing the previous track and recording another.

10. Marking the Audio Cue Sheet (Sync)

Purpose To provide a footage-numbered guide for mixing the sound tracks.

Forms: Audio Cue Sheet and Completed Final Scene List.

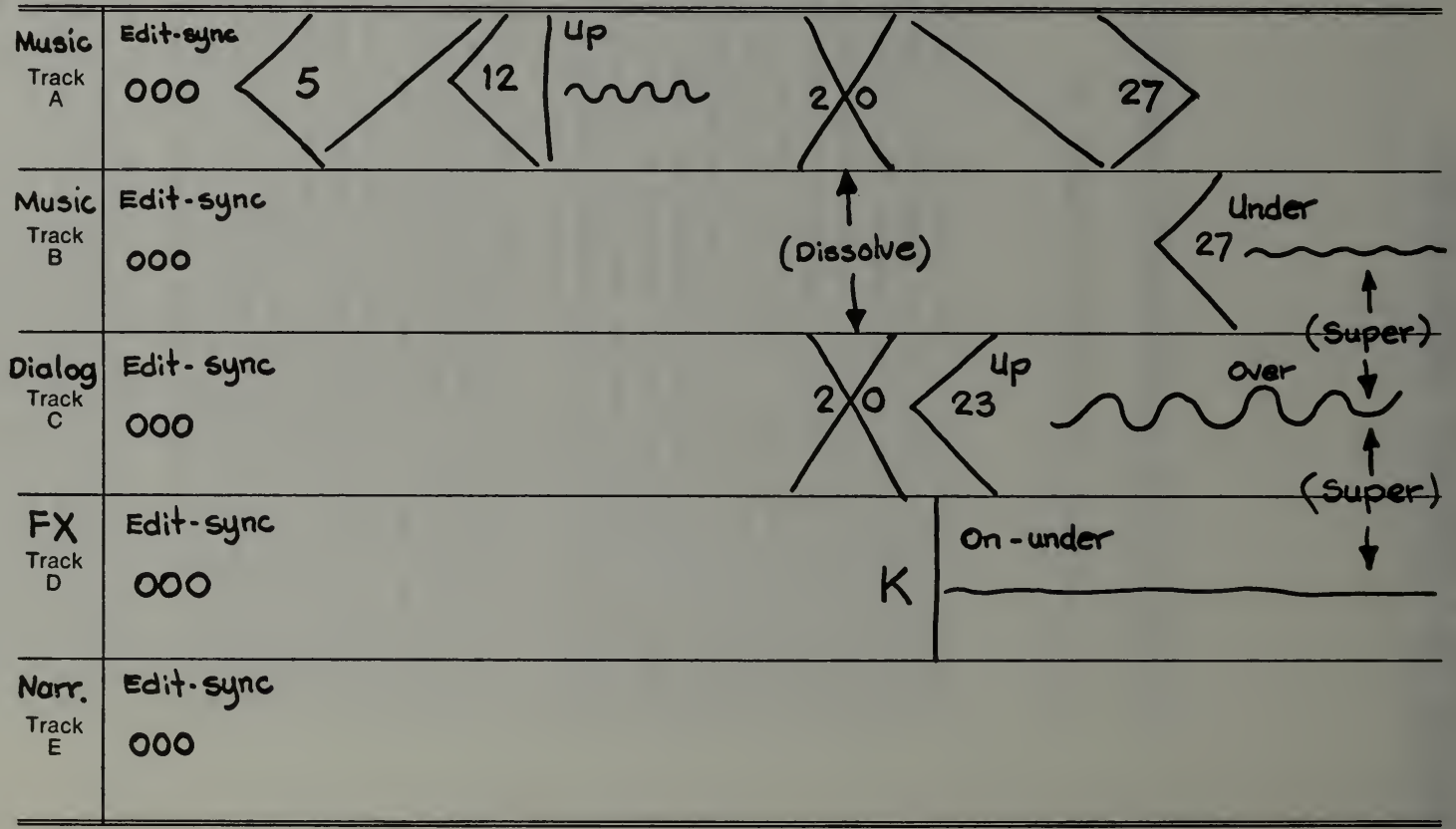
Sound mixing is both an art and a science: an art—because the somewhat abstract nature of the sound/picture relationship requires a high degree of aesthetic sensitivity on the part of the sound-mixing engineer; and a science—because of the many specialized electronic devices required to manipulate the sound signals into a meaningful and proper relationship to the picture. This artful manipulation requires complete concentration on the part of the mixing engineer during the mix. He must not be distracted. Therefore, he must have complete understanding of what the filmmaker wants, plus clear and concise directions on how to accomplish this. These directions take the form of (1) an Audio Cue Sheet (see Figure B-20) and (2) certain visual cue markings on the workprint, which will appear on the projection screen during the mix.

You will find that of the two suggested forms of communication with the sound-mixing engineer, the Audio Cue Sheet is preferred over the visual screen marking. Most mixing engineers prefer the Audio Cue Sheet simply because it allows them to leaf through the effects, spot where they are to happen, and to get an overall view of the sound-and-picture pattern. However, for your own information, and as a check against mistakes in the cue sheet, it is suggested that you also mark the workprint. The following discussion suggests the marks to be used on the Audio Cue Sheet and/or the workprint. The information contained in the Final Scene List will be a great help to you during the marking procedure.

If you plan to use only the visual markings on the workprint, it is further suggested that you also mark the start of each effect with a ready-to-start mark. This mark can be almost anything that does not interfere with the existing marks. You can use a sync-punch, but the problem with punching a hole in the workprint is that you can't undo it if you make a mistake or if you want to change the marking. Thus, the best marks are those that can be wiped off on the print—for example, a solid grease pencil mark. Yellow

Name _____ Course _____ Section _____ Page _____

Production _____ Date _____ No. of Channels _____



000 = sync punch < = fade-in > = fade-out ~~~ = sound continues K| = key-off X = dissolve or seque
(if in more than one track = supered sound) on

Start all footage count from sync punch (000). Put LARGE numbers on head and tail of effect.

Figure B-20. Audio Cue Sheet

is the best color since it can be seen on both color and black and white film; and perhaps the best type of marking is a regularly spaced series of dots, which most sound mixers will recognize as a ready-to-start mark (see Figure B-21). The 36-frame "get-ready" time (1½ seconds), shown in Figure B-21, can be modified to suit the sound mixer's reaction time.

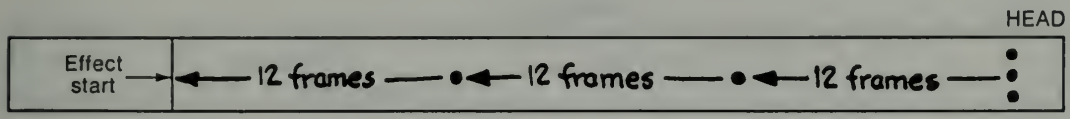


Figure B-21. Suggested "Ready-to-Start" Marks

Sound Fades

There are four points of information about the sound **fade** that the sound mixer should have, and they should be written on the Audio Cue Sheet and/or the workprint:

1 Start point of the fade-in

2 End point of the fade-in

3 Start point of the fade-out

4 End point of the fade-out

The difference between the footage of 1 and the footage of 2 will give the length of the fade-in. Likewise, the difference between 3 and 4 gives the length of the fade-out. The difference between 1 and 4 will give the total length of both effects.

Marking the Start Point of a Fade-in. Place the edit-sync marks of the head leaders for both the workprint (base-up) and the sound track (oxide-up) at the index arrow of separate gangs on the synchronizer. Lock the synchronizer, and set the footage counter to zero and the frame counter to 1. Enter the edit-sync mark as "000" on the cue sheet, as indicated in Figure B-20. Unlock the synchronizer, and measure the footage from the edit-sync mark to the start of the first fade-in. Mark this point (as indicated in Figure B-22) with a yellow grease pencil on the workprint and a felt-tip pen on the sound track. Record the footage on the Audio Cue Sheet, along with the symbol for the start point of fade-in (see Figure B-20).

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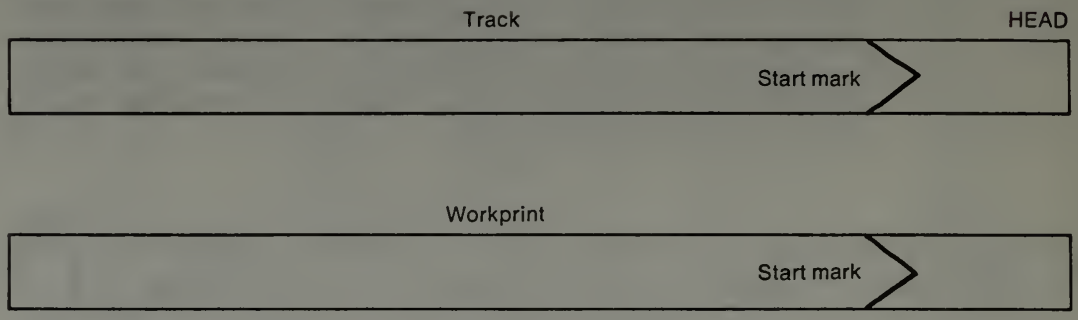


Figure B-22. Marking Start Points of Sound Fade-in

Marking the End Point of a Fade-in. Measure the length of the effect. This information can be taken from the Final Scene List or from your previously marked films (see Section B-2). Write the footage and the symbol for end point fade-in on the Audio Cue Sheet (see Figure B-20), and mark the workprint and track as shown in Figure B-23.

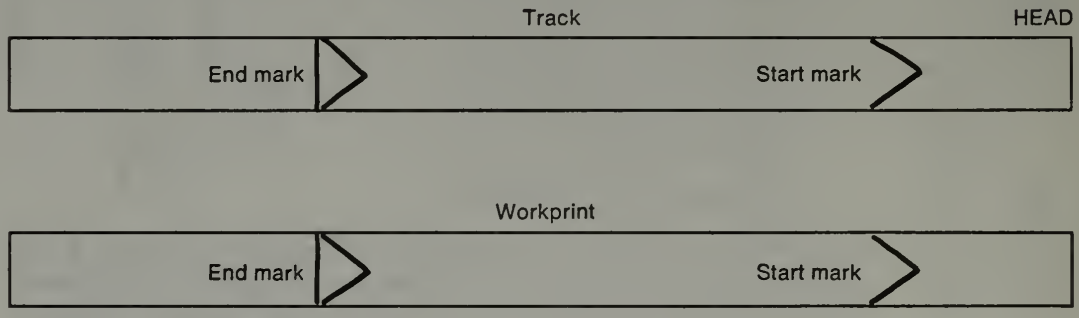


Figure B-23. Marking End Points of Sound Fade-in

To provide the sound mixer with a visual cue as to the length of the fade-in, draw a slanting line across the workprint from the start point to the end point of the fade-in (see Figure B-24). It is not necessary to mark the sound track. Mark the Audio Cue Sheet as indicated in Figure B-20.

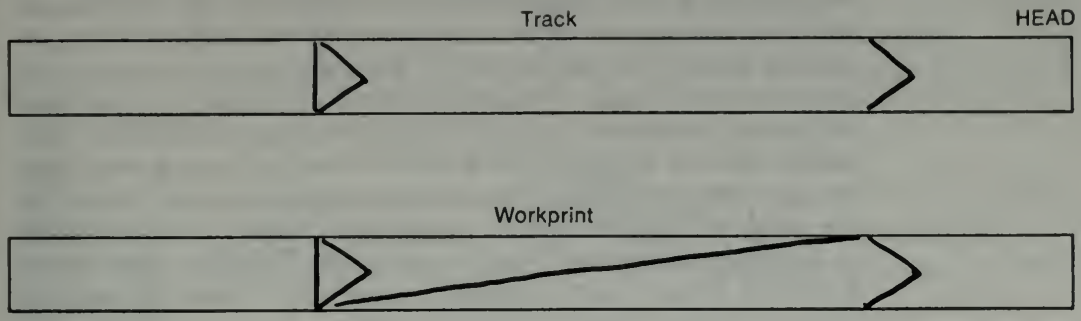


Figure B-24. Marking Length of Sound Fade-in

This slanted line will appear to move from the left to the right on the screen; and as the line approaches the right side of the screen, the sound mixer knows the end point of the fade-in is coming.

Marking the Start Point of a Fade-out. Measure the length from the head-leader edit-sync mark of the workprint and track to the start point of the fade-out. If the fade-out is followed immediately by a fade-in on the same sound track, then several extra frames of both scenes should be left in between to allow the sound mixer time to manipulate the volume controls (see Figure B-27). Record the symbol and the footage on the cue sheet (see Figure B-20), and mark the workprint and track as indicated in Figure B-25.

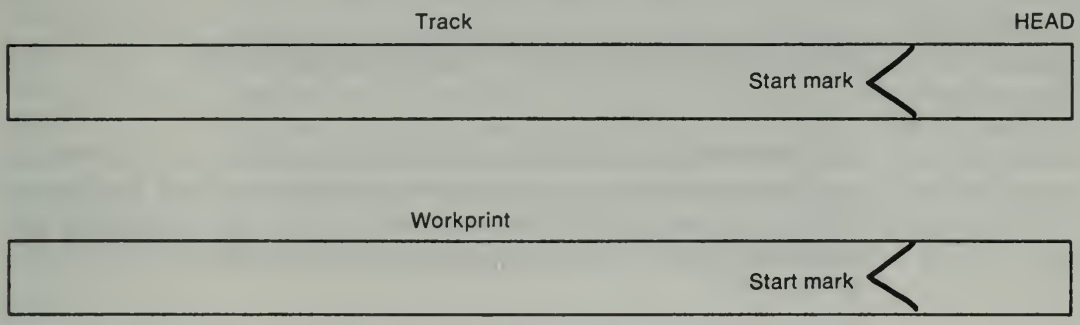


Figure B-25. Marking Start Points of Sound Fade-out

A much better way of cutting a sound fade-out to be followed immediately by a sound fade-in is to cut a two-track mix. This means that the fade-out will be on one track and the fade-in will be on another track. This technique will allow the sound mixer utmost control over the fades. If the sound-fade combination is a two-track mix, place the second track on the synchronizer. (Remember, both tracks must be slugged with leader so that they equal the entire length of the workprint.) Then measure and mark (both tracks) as you would a single-track fade, leaving extra frames on both in order to give the sound mixer time to manipulate the fades (see Figure B-27). It is difficult, at the projection speed of 24 frames per second, to start or end a fade on an exact frame.

Marking the End Point of a Fade-out. Follow the same steps as in previous paragraphs, except that the slanting line should be drawn in the opposite direction from a fade-in (see Figure B-26) and the line will appear to move from the right to the left on the screen. Record the symbol and the footage on the Audio Cue Sheet.

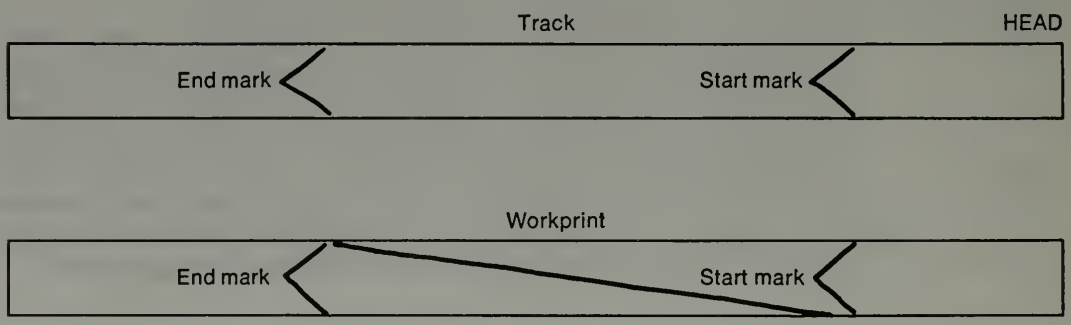


Figure B-26. Marking End Points and Length of Sound Fade-out

For a one-track sound fade-out followed by a fade-in, or a two-track mix of these effects, the final markings should now look like Figure B-27, although the fade-out and fade-in may not necessarily be juxtapositioned in that way. Fades can be any desired (and practical) length.

When cutting sound fades into two tracks, write footage and symbols in two separate columns on the Audio Cue Sheet (see music tracks A and B, footage 27, for example).

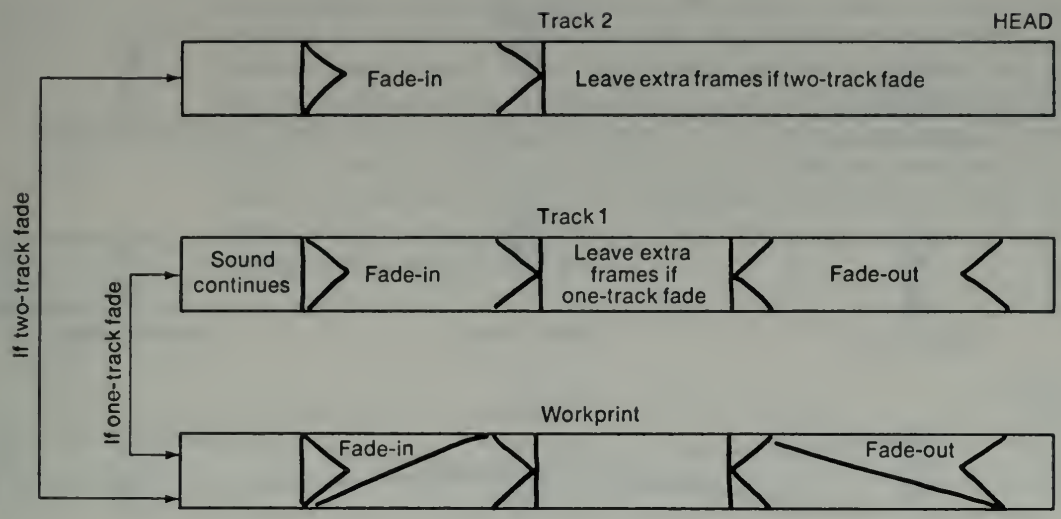


Figure B-27. Completed Marking for Sound Fades (One Track and Two Track)

Sound Dissolves and Segues

A sound **dissolve** is an *overlapped* fade-in, fade-out. Therefore, you are necessarily working with two tracks. In measuring and marking dissolves, follow the same steps as in sound fades, but make the slanting lines and marks overlapping. In addition, mark the center of the dissolve on both picture film and sound track with a small "x" on each side of the marked center line (see Figure B-28). A sound dissolve may or may not correspond to a picture dissolve. Sound dissolves may be any desired (and practical) length, but you should take care that they match the feeling of the scene. **Segues*** can be marked in the same manner, but with shorter lines than the dissolve. The actual blend of the segue must be worked out experimentally, since it depends on fitting two sounds into a transitional point. Mark the Audio Cue Sheet with the symbols and footage of both the dissolve and the segue (see Figure B-28). As the converging slanted lines (showing the length of effect) meet

*A segue differs from a sound dissolve, in that the sound change (blend) is not overlapped. It still requires two tracks (see also **Segue** in the Glossary).

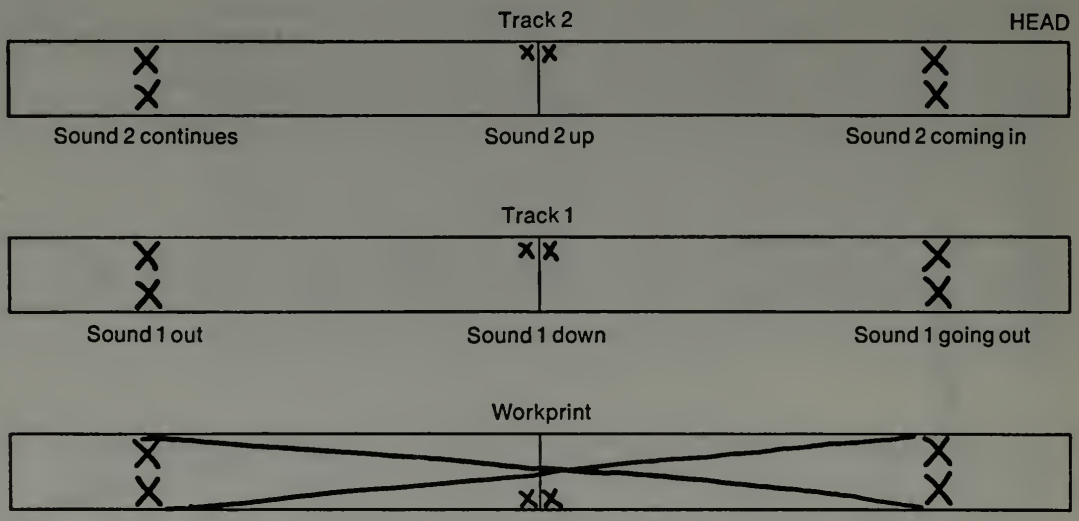


Figure B-28. Marking the Sound Dissolve

at the center point on the screen, the mixer knows that both sounds are in and that sound 1 is fading out and sound 2 is fading in.

Sound Super-impositions

Some sound **super-impositions**, or supers (multiple sounds heard simultaneously), are relatively simple; that is, they require the splicing of multiple tracks in such a way as to allow the various sounds to be reproduced simultaneously. With these effects, it is simply a matter of transferring the various tape sounds to film tracks; marking tracks, the workprint, and the Audio Cue Sheet; and then adjusting the sound volume level on the different tracks during the re-record or final mixing.

With the cutting of supers that must be timed to fit the visuals accurately or that require controlled sound-volume levels for the various sounds in-sync with the picture, you must be especially concerned with marking precisely and clearly *where* the various sounds come in and go out and how they are to do this. In some cases, you might want individual sounds to pop onto the track (for

a long shot to close-up), or you might want to fade-in each of the sounds (for a slow zoom-in effect). No matter which effect you choose, each sound from each track must be accounted for on the workprint and the individual track, and the footage and symbol for each effect must be recorded on the cue sheet (see Figure B-20). Since it is difficult to mark supers on the workprint for visual cues, you will most likely rely completely on the cue sheet for guidance in mixing the various sounds. For suggested but difficult-to-use marks, see Figure B-29.

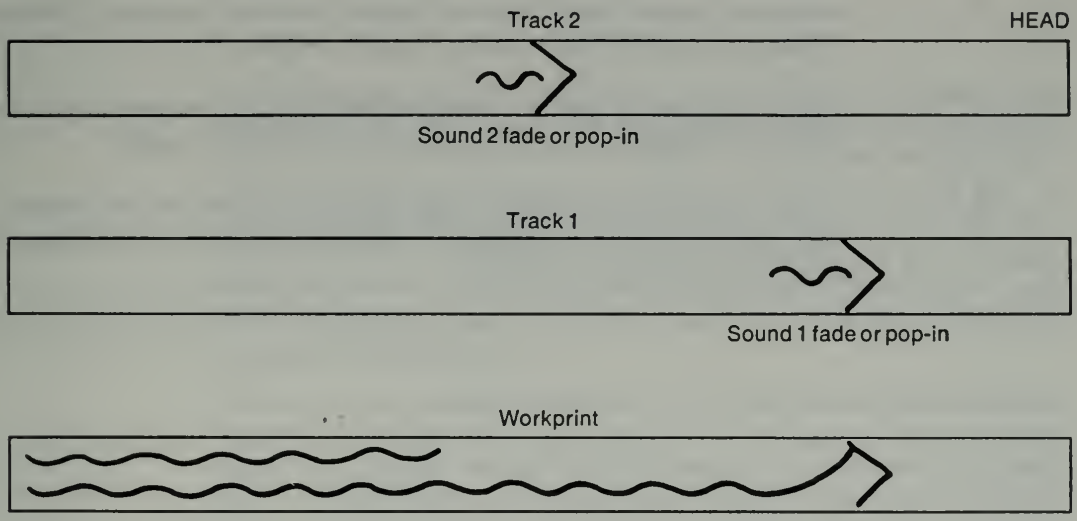


Figure B-29. Marking Super-impositions

Checklist for Re-recording and Mixing

1 Always consult with your lab.

2 Always provide a sync-tone point as a check for sync.

3 If you use scrap picture or positive-print stock for leader on magnetic tracks, always splice the scrap film so that the base side of the scrap is in the same position as the oxide side of the magnetic film.

4 If you use scrap magnetic stock for a track leader, make certain that there is no noise or signal on it. Run it through a sound reader at full volume.

5 Do not use magnetic metals when cutting magnetic film; they may cause pops (bloops) in the sound.

6 Make certain that all splices and sprocket holes are firm and clean. Run the tracks through a folded piece of tissue or through editing gloves. Any splices or sprocket holes that catch should be checked.

7 Run your tracks through a sound reader (or better, a dubber). Check for any unwanted beeps, pops, bloops, words, etc.

8 Allow at least 10 feet of unmodulated film on the heads of the master-recorder film to serve as a head-threading leader.

9 Using small pieces of white tape, mark the frame of the master-recorder film that is in edit-sync with the sound rolls and workprint when all rolls are in interlock.

11. Preparing Printing Leaders

Purpose To provide a procedure for marking and syncing standard printing leaders for the master sound roll.

A complete and detailed method for preparing ACL standard printing leaders for the sound rolls with sound track advanced can be found in the ACL Handbook.* However, since most student filmmakers prepare head and tail leaders in edit-sync rather than in print-sync (with the sound track advanced), the following less complicated method will serve in most cases. This section also outlines methods for syncing and splicing the leaders to the sound roll. (Instructions for preparing printing leaders for the picture rolls are outlined in Section A-9).

By far the most sensible method for preparing sound-roll printing leaders, heads and tails, is to leave extra footage on the head and tail of your master re-recorded roll (procedure outlined in Section B-4). This method is strongly recommended because it automatically provides two sync check points as you mix the various tracks.

If you have the extra footage on your master roll, and if it is marked for sync, you need only trim and identify your sound-roll leader, as shown in Figures B-30 and B-31, and punch a hole in the start-mark tape piece on the head leader. This puts sound roll in edit-sync. If you cannot do this, follow the procedure below for preparing sound-roll leaders and for finding and marking sync points on leaders.

Preparing Sound-Roll Head Leaders

For a magnetic sound-roll head, splice 2½ feet of black leader onto the tail of 12 feet of white leader. Both should be single-perforation stock (such as Kodak white leader #WL458). For optical sound rolls, follow the same procedure, substituting clear leader (such as Kodak #LC458) for the black leader. Make certain that you splice the black (or clear) and the white leader in such a way

*See page 45.

that they will correspond with the single perforations of the sound roll. For both magnetic and optical track and leaders, the proper position, when laid on the editing table, is emulsion up, perforations away from you, with the heads of the sound roll and leader to your right. This is the way the film runs through the synchronizer. Remember, on a piece of single-perforated stock, there is only one head and one tail position.

If positive-print stock (unprocessed) is used as leader on a magnetic sound roll, make certain that the **emulsion** side (usually the dull side) of the print stock is on the same side as the *base* side of the black leader or the magnetic film. The relatively soft emulsion of positive-print stock, if run across the sound heads of the dubber, will "powder" and clog the head gap. This results in poor contact of the film with the head and produces distortion and lower sound level (plus an angry sound engineer).

Preparing Sound-Roll Tail Leaders

Splice a 2½-foot piece of single-perforated black leader (clear leader for optical roll) onto the *head* of a 10-foot piece of single-per-

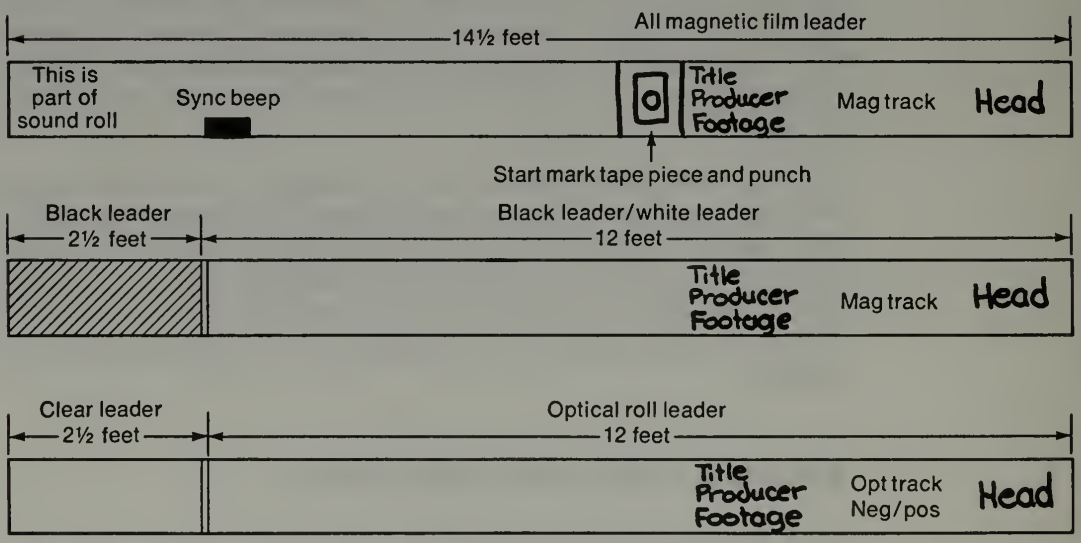


Figure B-30. Identifying Sound-Roll Head Leader

forated white leader. In addition, splice a 2-foot section of black leader onto the *tail* of the white leader. This final black-leader piece is used to identify the "tails-up" position of the roll. Be sure the perforations are correctly positioned.

Identifying Sound-Roll Leaders

Mark the sound-roll leaders as indicated in Figures B-30 and B-31.

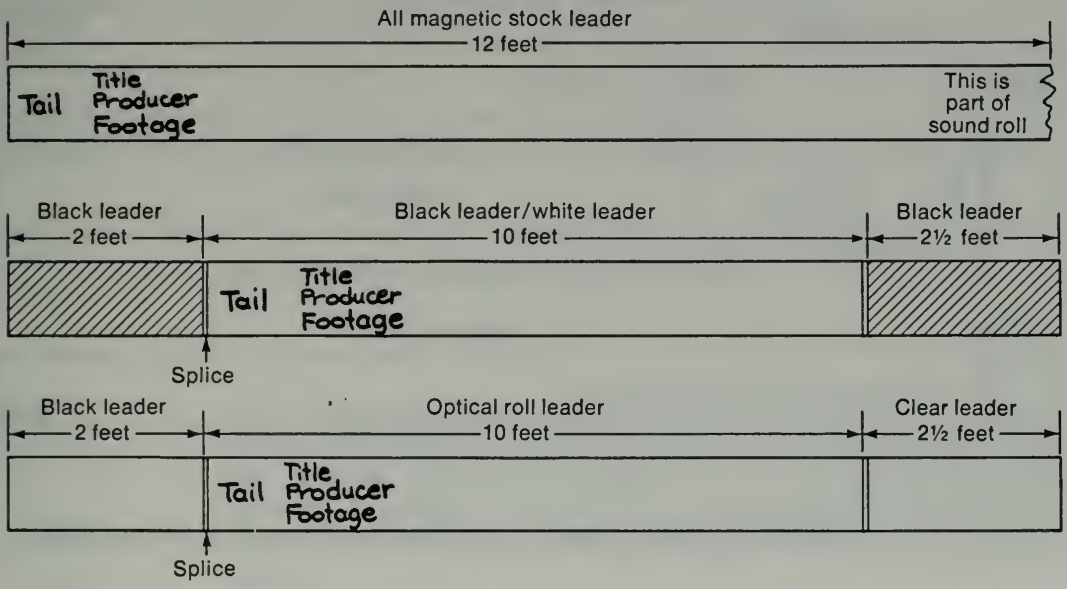


Figure B-31. Identifying Sound-Roll Tail Leaders

Finding Sync Points and Splicing Sound-Roll Head Leaders

In order to sync the black (or clear) white head leader to your sound roll, you must find a corresponding sync point between picture and sound. The code numbers, ink-printed footage numbers, or any other corresponding markings between picture and sound will do.

Step 1 Place the workprint and the sound rolls in sync on the first and second gangs of the synchronizer. Roll the films to the left until

you reach the first picture frame of the workprint. Lock the synchronizer. Using a yellow felt-tip pen, mark the right frame-line of the matching frame of the sound roll (see Figure B-32).

Step 2 Count 80 frames from the splice between the white leader and the black or clear leader. This can be done by mounting the first frame of black or clear leader on the third gang, setting the footage counter to zero and the frame counter to 1. Unlock the synchronizer and roll the three films to the right for 80 frames (2 feet). Now lock the synchronizer and mark (using a yellow felt-tip pen) the left frame-line of frame 80. (It should be in the black or clear leader section of the head leader.) Frame 80 should also be marked with "X." As you will see, the frame-line mark will attach to the sound roll.

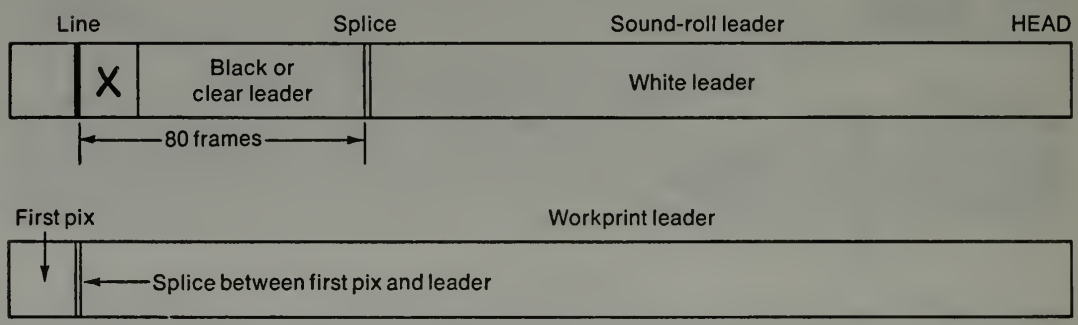


Figure B-32. Marking Black or Clear Sound-Roll Head Leaders for Sync Points

Step 3 Remove the sound-roll leader. Leave the workprint and sound roll in the synchronizer. Roll the films a few feet to the right to gain working room for the sound-roll head-leader splice. Lock the synchronizer. Splice the head of the sound roll, at the right frame-line mark, to the left frame-line mark of the black or clear leader section of the head leader. Now unlock the synchronizer and roll the film to the left until you reach the "edit-sync" mark on the workprint. Mark (do not punch) this corresponding frame on the sound-roll head leader with an "X" (using a black felt-tip pen). It is recommended that you now mount the A-roll of the original picture on the third gang of the synchronizer, with the edit-sync mark at the index arrow. Set the footage counter to zero and the frame counter to 1, and roll the films to the right until you reach the frame to the immediate right of the first picture frame. The footage counter should read 7 feet, and the frame counter should read 28 frames. Check all sync-point markings. Return the films to the edit-sync marks, and mark as indicated in Figure B-33.

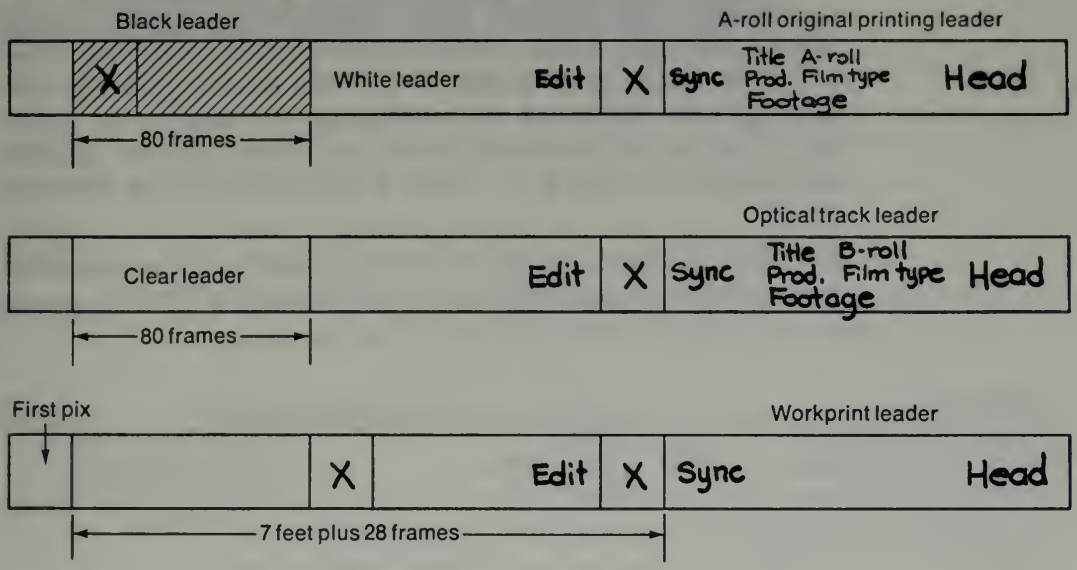


Figure B-33. Edit-Sync Marks on Sound-Roll Leader

Step 4 Run the workprint and sound roll in interlock projection to check picture/sound sync. Use the edit-sync mark on the workprint and trial edit-sync mark on the sound roll as start points. Make any corrections needed; then, only when you are absolutely certain of correct sync, punch a hole in the edit-sync mark on the sound-roll leader.

Finding Sync Points and Splicing Sound-Roll Tail Leaders

Step 1 Place head leaders of the workprint, sound roll, and A-roll of original picture on synchronizer gangs 1, 2, and 3 respectively, with the edit-sync marks at the index arrows. Carefully roll through the entire film until you reach the splice frame between the black leader and the white section of the A-roll tail leader. Lock the synchronizer.

Step 2 Place the prepared tail leader for the sound roll on the third gang, with the splice frame between the black-leader section and the white-leader section at the index arrow. Roll the films to the left until the splice frame between the leader and the last picture of the A-roll is at the index arrow. Lock the synchronizer. Mark (using

a yellow felt-tip pen) the right frame-line of the tail sound-roll leader and the left frame-line of the sound roll to match the splice in the A-roll. Unlock the synchronizer, and roll the films to the left to gain working room. Splice the tail around the roll leader to the sound roll at the yellow frame-lines. Mark and identify the tail leaders, as indicated in Figure B-34. Punch a hole in each of the edit-sync marks.

See the introduction to Sound Cutting, page 64, for a discussion about preparing printing leaders in edit-sync or print-sync.

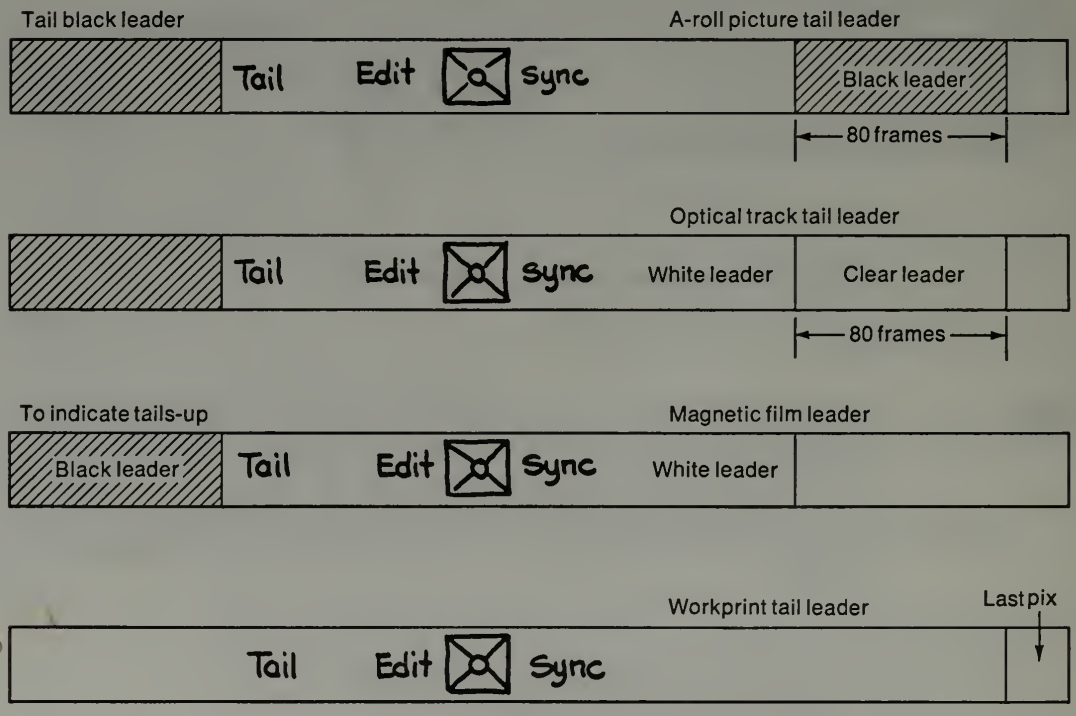


Figure B-34. Marking and Punching Edit-Sync on Sound-Roll Tail Leaders

Your picture rolls and sound roll are now completed and ready to send to the lab for first answer printing. You must now prepare the instructions to the lab for printing the answer print.

12. Preparing Laboratory Instructions

Purpose To provide clear and meaningful instructions to the laboratory for proper printing of the conformed original and sound track.

Form Laboratory Printing Instructions.

The first **answer print** (also known as the **first trial composite print** and the **pilot print**) is, as the name suggests, a single first print made by the laboratory from the conformed original rolls and the sound roll. The filmmaker is expected either to approve the print as is and order a quantity of prints or to alter the original film or sound rolls and return it to the lab for a second answer print before additional prints are ordered.

In order to be certain that the lab fully understands how you want your original film and sound rolls printed, you must send complete instructions indicating the position and the length of any special effects type of print, sound track, and print stock wanted with each film sent to the lab for printing. However, you should never mark on the original film or sound rolls, nor should you use paper clips or labeling tape. Some filmmakers use Kum-Kleen labels on the emulsion side of the black leader to indicate effects, but the following procedure is far more certain and safe.

Step 1 Place the leader edit-sync marks of the conformed original rolls at the index arrow of gangs 1 and 2 on the synchronizer. Place the sound-roll leader edit-sync mark at the index arrow of gang 3 (or, if your synchronizer is equipped with a sound reading head, place the sound roll on that gang). Lock the synchronizer, and set the footage counter to zero and the frame counter to 1.

Step 2 Measure the footage and frames from the edit-sync mark for each effect. While running through the film, also inspect each scene change for such defects as flash frames, questionable splices, incorrect checkerboarding, and the like.

Step 3 Record the footage and frames to the start of each effect under the appropriate column of the Laboratory Printing Instructions form, and describe the type and length of the effect under the "Description and Length of Effect" column (see Figure B-35). Make a copy of this sheet, send one to the lab, and keep one for yourself.

Name Joe Call Phone 689-4215 Date 2/23/72

Address 123 Jones St., Midtown, Ca. 90000 Date Wanted 2/30/72

Film Title Up and Down Length 233 feet

Number of Picture Rolls 2 Color ___ B & W X Sound Rolls: MAG X OPT ___

Type of Print or Service Wanted First Answer

Type of Track Wanted: Photo-print ___ Electro-print X Print Stock EK-7361

Special Effects Cues

Footage/Frames to Start of Effect	Description and Length of Effect
000	Start marks in edit-sync, please advance sound track
7/28	Start 24 frame fade-in on first pix frame, A-roll
26/8	Start 48 frame dissolve - centers marked
42/16	Start 2 foot plus 28 frame super, print down B-roll
103/4	Start 24 frame dissolve, centers marked
112/0	48 frame freeze-frame, cut into A-roll
200/27	Start 36 frame fade-out, B-roll
201/23	End previous 36 frame fade-out, B-roll
201/24	Start 36 frame fade-in, A-roll
202/20	End previous 36 frame fade-in, A-roll
226/22	Final fade-out, all rolls
233/24	Tail sync marks

Figure B-35. Laboratory Printing Instructions

Now, let's go over each of the items in Figure B-35.

1 Your name, address, phone number, and film title: This information is important to the lab, in case they want to contact you regarding your film. Also, if the film and instruction sheet become separated, the lab has this information on both and can reunite them.

2 Date wanted: Give the lab plenty of time to do a good job for you, but be definite about a delivery date. If need a rush job, try to give the lab notice *before* you deliver your film for printing.

3 Number of picture rolls: You pay for each separate roll of original film printed, so the lab should know how many rolls

are submitted (that way there can be no arguments later concerning lost or misplaced rolls).

4 Color or B&W: Give the lab the chance to plan their printing and processing runs, if they have separate schedules. This method results in a shorter delivery time for you.

5 Sound roll (magnetic or optical): Give information about your materials submitted; doing so will allow the lab to plan a production schedule.

6 Type of print wanted: Be specific, such as "1 ea. timed, first answer reversal color print," or "3 ea. release, reversal color prints, from timed originals," etc. Consult with the lab regarding their price break and printing services.

7 Type of track wanted (photo-print or electro-print): Detail this—so there can be no misunderstanding concerning the finished print (for a discussion of the two-track types, see page 124).

8 Print stock: Since labs use different types and brands of release (or answer) print stock, be certain you know what is best for your film and let the lab know.

9 Special effects cues: The lab must know what you want or how you want your film printed. Be specific (as examples given) for each of your planned effects. Leave nothing to the imagination—to avoid a delay in the delivery of your film or the printing of effects that you had not planned. Take special note of the first entry on Figure B-35: Specify how the picture and track are marked for sync and whether the track should be advanced.

The average motion-picture laboratory handles hundreds of films every day. Mistakes are bound to happen, but don't let them happen to your film. Inform the lab of your needs.

In addition to completing the Laboratory Printing Instructions, you should take the following precautions:

1 If in doubt about any step in the preparation of your original rolls, consult your lab.

2 Use proper terminology.

3 Check all splices in the original film rolls, making certain that the splices will hold.

4 Submit leaders that are clearly marked with the film title, your name, and footage length of film.

5 Submit completed Laboratory Printing Instructions *with* the film and sound rolls. Be certain that leaders are properly marked for sync.

6 Ask your lab for a delivery date, and leave plenty of time for a delivery schedule.

7 Try to give advance notice on rush work.

8 Determine disposition of original materials. (Is lab to hold, or is this material to be returned?)

9 Indicate the method of return shipment. (What type of carrier and how much insurance?)

10 Ask the lab about its processing or handling insurance and its responsibilities.

Electro-printing and Photo-printing Sound Tracks

In this, and past sections, we have discussed some of the features of printing the original film rolls. We shall now discuss the processes by which the magnetic (or optical) sound roll is printed onto the combined A&B roll print.* For the first answer print, or small orders, the process that may be used is called *electro-printing*. For quantity orders of release prints the process used is called *photo-printing*.

Electro-printing is a process in which a separate magnetic sound track can be re-recorded directly to the sound-track area of the picture print. The resulting optical track is combined with and is an integral part of the finished picture print. It is the same as an optically printed track, except that it is re-recorded from the magnetic sound roll directly to the print, instead of the standard film-printer operation of re-recording the magnetic sound track to an optical sound-image track and then processing that optical track and using it to print the track on the picture print.

Electro-printing is normally utilized for the answer print or small orders of 16mm reversal prints, either color or black and white. When a 16mm film goes to positive black and white or color printing, it usually means a large release-print order, in which case the use of the standard photo-printing track is more economical. The average cost for electro-printing is about 1 cent a foot, plus the normal A&B composite-print prices. When this is compared to the re-recording rate for a photo-printing track of a little better than 10 cents a foot (for film stock, re-recording, and processing) it becomes apparent that the cost of electro-printing at 1 cent a foot is more economical for the answer print. However, if your release print order is for more than 10 prints and is to be made from a color internegative or a black and white negative, then a photo-printing track will save you the 1 cent per foot for electro-printing. Normally there is no additional charge for printing sound from a

*This material is drawn from the article "Electro-Printing," *Rewind*, Vol. 2, May 1960. By permission of the publisher, Deluxe General, Inc., Hollywood, Calif.

photo-printing track; in addition, more time is required for electro-printing sound. On small orders this is not a factor, but on a larger order it could be significant.

The electro-print sound quality is good, although the process lacks the consistency of results that is characteristic of the standard photo-printed sound track. For one thing, each exposed but unprocessed print requires a separate re-recording run, thereby increasing the likelihood of some quality variation of picture or sound within a group of finished prints. Another problem is that the threading of the exposed combined A&B roll print and magnetic track in the optical recorder and the magnetic dubber machine is critical. An error here could result in a lip-sync match that is not always as certain in large orders as is the photo-print sound method.

Still, electro-printing at .01 per foot has definite advantages:

1 For 16mm Ektachrome film headed toward a color internegative and positive-release printing, the first answer color-reversal print track can be electro-printed, eliminating the need for an expensive photo-negative printing track.

2 For the very small print order—a single print or a few prints—electro-printing provides a standard high-quality sound track at low cost.

3 For an important presentation of your film-in-progress, the electro-printed track provides professional sound on a trial print, so that any changes needed do not involve the economic loss of a scrapped photo-printing track.

4 Electro-printing is the obvious choice for alternative track versions of a film. For example, many English language releases also call for one or two prints with the same visuals but another language track.

For normal sound printing, the use of a photo-printing track is recommended for quantity-order economy, consistent quality, faster delivery, and accurate reproduction of the filmmaker's mixed sound. However, if you are in doubt about which process is better suited for your films and circumstances, consult, as always, with your lab.

13. Evaluating the First Answer Print

Purpose

To provide a guide for evaluating the picture and sound quality of the first answer print.

What should the filmmaker expect from the first answer print?* In most cases, a good acceptable print is obtained. But this doesn't and can't happen every time. It inevitably amazes the novice filmmaker that defects in the edited workprint or the conformed original rolls remain undetected until the first answer print. Every film veteran knows, however, that in viewing footage one normally looks either for mechanical factors or for dramatic impact and that it's difficult and perhaps impossible to do both at the same viewing. Small and even serious technical faults can slip by you when you are editing the workprint or conforming the original rolls, because you are and should be looking principally at the flow and action, at the overall dramatic impact, and at the accuracy and effectiveness of your cutting.

The source of any faults in the print may be the filmmaker or the laboratory or both. The filmmaker may look at this first print and find that he has made a mis-cut. Or he may decide some re-editing is necessary to improve the pacing or the action. He may also discover that a scene or scenes need replacement because of technical faults (flash frames, color edge-flares, etc.) that aren't noticeable during the cutting process or the final viewing of the workprint. Discovering such problems is one reason for making a single print first; the other is the opportunity of the filmmaker to review the laboratory work for cleanliness of the print, timing, color, effects, and so on.

The reviewing process on the first answer print is one of many times when mutual respect and understanding are very important in the relationship of the filmmaker and the lab. If something is wrong or questionable in the print, the filmmaker and the lab must be able to view and discuss the problem objectively. They will be able to do this if they have established a good working relationship and if they are agreed on the following procedures for reviewing the answer print.

*This material is drawn from the article "What to Expect of the First Trial Print," *Rewind,* Vol. 3, February 1961. By permission of the publisher, DeLuxe General, Inc., Hollywood, Calif.

1 *Project and inspect the print under standard and agreed conditions.* The appearance of a print in screening will vary considerably with the quantity and quality of light on the screen, the size of the projected picture, the angle of viewing, the speed of the projector, the alignment of the projection lamp (or the adjustment of the carbons in arc projection), and the cleanliness of the film gate and lens. Even the sharpness of the projection lens itself is a major factor.*

Let's assume that the viewing and sound-monitoring conditions are standard, that all the machinery works well, that the filmmaker has even run the print on a second projector just to be sure, and that something is definitely wrong on the film. For instance, there is an unexplained flash in the middle of a scene or a jump at a straight cut, a variation in color or density within a scene or light flashes along an edge, a scene that is too dark or too light, or title lettering that is difficult to read. (There may also be problems with the sound track, of course—scratchy or muffled sound or perhaps even the wrong track.) This takes us to the second and third suggestions.

2 *Determine the exact nature of the print defect.* Obviously, the first sensible move is to check the print defect against the conformed original rolls to see whether it is there or whether it came in later. The next move is to determine exactly what the defect is and how it may be corrected.

3 *Only after determining the exact nature of a print defect should you proceed to place blame for the problem.* Before you start asking *who* is right or wrong, you should know *what* is right or wrong. Both the filmmaker and the laboratory should be interested, first of all, in knowing *why* and *how* a defect was introduced, in order to make prompt correction and to safeguard against recurrence. Launching arguments and recriminations about blame merely delays and confuses a satisfactory conclusion.

Still, problems can't always be resolved neatly and amiably, and laboratory equipment and personnel do make mistakes. If you are certain that the lab is the source of the defect, call their attention to this fact in a businesslike manner. Film laboratories depend on good customer relations for future business; and they will assume the responsibility to make the proper corrections.

*The first answer print will also include the sound track as well, and standard monitoring conditions are equally important for judging the quality of the track. For instance, the sound track will vary with the basic quality and state of maintenance of the entire amplifying system, the amperage and alignment of the sound-track lamp, the threading of the film in the projector, the size and location of the speaker, the cleanliness of the film sound track, the acoustics of the preview room, and even the positioning and noise of the projector.

Table B-2 lists some of the common defects found in answer prints, as well as the possible causes of these defects and the methods for checking and correcting them.

Table B-2. Correcting Defects in the Answer Print

Defect	Possible Cause	Checking and Correcting
Flash frames	*a.* Flash frames left in A&B rolls	View rolls in-sync over lightwell.
	b. Out-of-sync A&B rolls	See page 58.
Black frames	Out-of-sync A&B rolls	See page 60.
Scenes too dark or too light	*a.* Incorrect print density timing of scenes	Check with lab—see whether scenes can be retimed more to your liking.
	b. Faulty processing	Ask lab to check other film footage processed that day. If the original rolls are good quality—call this to their attention.
Color faulty in a few scenes	Incorrect color balance	Check with lab—they may be able to correct some scenes.
Color faulty throughout film	Faulty processing	See processing fault above.
Jumps before or after cuts	Faulty splices	Check all splices; re-splice questionable ones.
Dissolves or supers that don't work as planned	*a.* Insufficient information given to lab	Check with lab; explain what you want. See page 122.
	b. Incorrect printing	Ask lab to reprint.
Sound out-of-sync throughout film	*a.* Wrong sound track	Check title and production number on picture and track leaders.
	b. Sound track incorrectly marked for printing	Check with lab: Did they understand what you wanted? Was track sync-marked on leader? If they erred, they should reprint at their expense. See page 64.
Sound out-of-sync in a few scenes	Track incorrectly cut to picture	Check your picture and sound in interlock. Find mistakes and correct them.

14. Lifting Off Single-System Sound

Purpose To explain a technique for adapting single-system sound-on-film to the double-system cutting methods.

Probably the best way to edit single-system sound and picture is to reposition (displace) the sound track to edit-sync with the picture (see Section B-15). However, only magnetic track can be handled this way; optical sound track requires that you lift-off, or **transfer**, the sound-track band onto a separate film track, so that you can use double-system cutting methods on the film. There are two methods for accomplishing the transfer.

With the first method, a dupe sound print is made of the sound band on the film (only the sound aperture is used in the printing process). There are two things you must be careful about with this method: (1) Be sure to punch the original single-system film in a manner so that it can be synchronized with the dupe sound print. The punching technique should be similar to the punching marks used in preparing camera-original film for ink-printed edge-numbers (see page 15). Be certain also that a sufficient amount of threading leader is spliced on the head of the original single-system film. (2) Since the photo-printing aperture is closed during the sound-band printing process, be sure to instruct the lab to ink-print edge-numbers in-sync so that you will have some form of cutting-guide information.

The second method for lifting-off the sound bank on single-system film is an electronic process by which the single-system magnetic or optical sound bank is transferred, in-sync, to a separate sound roll by re-recording. However this method of re-recording the sound band can be done only by those labs with hollow-ground rollers on their film photographs and dubbers (this reduces the chance of damaging the film by keeping it from contacting the roller surfaces). The Siemens projector, Model 2000, and similar projectors*

*Other models are Sonorex (Arriflex Corp. of America), Bauer P6 Synchron (Allied Impex Corp.), and the Palmer Interlock Projector, Model PGPS (W.A. Palmer Films, Inc.). These projectors can also be used for interlock projection of double-system films. It is important that whatever model projector you use, it must be powered by a synchronous 60-Hz, 110- or 220-volt AC motor, and it must be able to synchronize with whatever dubbing or recording equipment you are using.

are equipped in this way to lift-off both optical and magnetic single-system film. The precautions taken to mark sync points and identify with footage edge-numbers with the first method are equally important with this one.

Once you have a dupe sound-track film, you may proceed to edit your picture and sound as in the double-system method. Check with your lab before you plan on using either method, both of which are expensive.

15. Displacing Magnetic-Striped Single-System Sound

Purpose

To describe a method for shifting the sound-frame advance on magnetic single-system sound-on-film to allow straight-across cutting.

A displacement recorder* (actually a **re-recorder**) is used to re-record the sound band on magnetic single-system film and to automatically reposition the sound band on the film so that it is in edit-sync with the picture. In other words, the sound band is repositioned so that matching frames of picture and sound are in-line, whereas normally with single-system sound film the corresponding sound and picture frames are 28 frames apart.

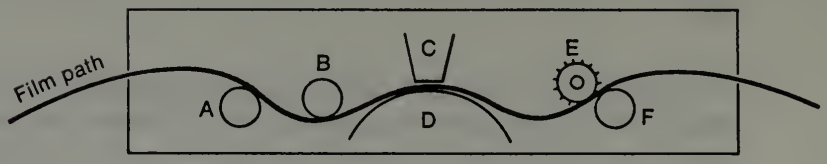
Operation of the displacement re-recorder is made possible by placing the recording and playback heads on the machine 28 frames apart and placing the erase head between the playback and record heads. Then, as the film passes over the three heads, the sound is simultaneously picked off by the playback head, amplified by a playback amplifier, erased by the erasing head, and re-recorded by the record head 28 frames displaced. When the film is run in one direction (right to left) through the recorder, the sound and the corresponding picture are re-recorded in-line. When the film is run through the recorder in the opposite direction (left to right), the sound is re-recorded so that it is again displaced 28 frames ahead of the corresponding picture.

Once the picture and sound are in-line, of course it is possible to cut single-system film straight across without harm to the sound track and without any risk of losing picture-and-sound sync. When the film is edited, the displacement recorder can be used again to reposition the sound track on the film so that it can be used on the sound projector. The displacement re-recording technique is used mainly by television news cameramen and film cutters, who require immediate projection after the cutting and re-recording process. Using single-system magnetic-stripe film and this displacement technique eliminates the need for equipment associated with the more conventional, double-system transfer of original single-system sound band to a separate sound film for editing. A dis-

*For information regarding Model DR-1, a displacement recorder, write to Magnasync/Moviola Corp., 5539 Riverton Ave., North Hollywood, Calif. 91601.

placement recorder and a viewer equipped with a magnetic pickup sound head are the only pieces of equipment required (see Figure B-36). This displacement to in-line position, however, does preclude the use of A&B rolls to make scene changes invisible (checkerboard technique, see page 51). Dissolves, double-exposures, or other effects requiring two or more film rolls are also precluded.

However, more and more documentary filmmakers are using the displacement technique, cutting their films in-line and then lifting-off the sound track to obtain the benefits of double-system cutting.



A Guide roller
B Guide roller
C Picture-projection aperture
D In-line magnetic pickup head
E Drive sprocketed roller
F Clamp roller — keeps film clamped to drive roller and turns lamp on when closed and off when opened

Figure B-36. In-Line Viewer and Sound Pickup Head Editing Machine*

*For information regarding Moviola Model 50, a 16mm professional viewer, write to Magnasync/Moviola Corp., 5539 Riverton Ave., Hollywood, Calif. 91601.

16. Cutting Single-System Sound-on-Film

Purpose To explain three common methods of cutting single-system sound-on-film footage into a usable film form.

There are ways to edit single-system sound-on-film footage so that the picture/sound offset inherent in the system is remedied without displacing or lifting-off the sound track. We shall explore three of the most common methods: (1) **lip-flap** cutting, (2) cutting on the silent action, and (3) A&B rolling single-system sound-on-film. Let's review the problems of single-system sound-on-film cutting.

The sound is recorded 26 frames (optical sound track) or 28 frames (magnetic sound stripe) ahead of the corresponding picture. You cannot simply cut and splice one scene to another (Figure B-37).

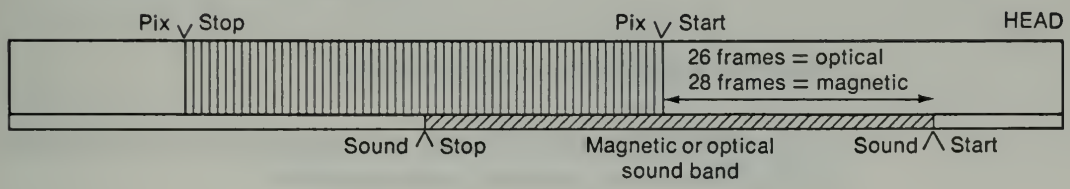


Figure B-37. Picture/Sound Separation with Single-System Film

When the camera stops, the shutter frequently stays open, fogging one or more picture frames; at the same time, the optical-track exposure lamp causes a burn in the track area—and this also may fog a picture frame (Figure B-38).

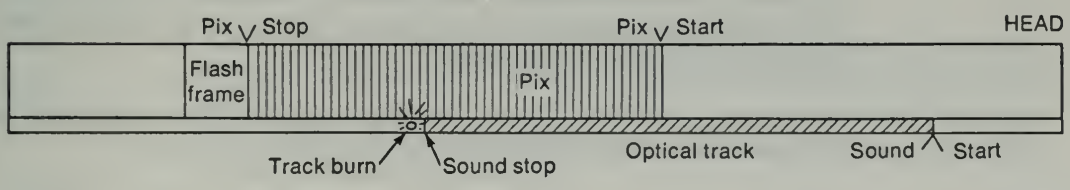


Figure B-38. Camera Stop Flash Frame and Track Burn

In the case of magnetic sound stripe, a **wow** (whine) is produced on the track, as the camera slows down to a stop (Figure B-39). This produces yet another problem—that of undesirable picture footage, which must be cut out; but if it is, the sound track at the head of that scene is also cut out (Figure B-40).

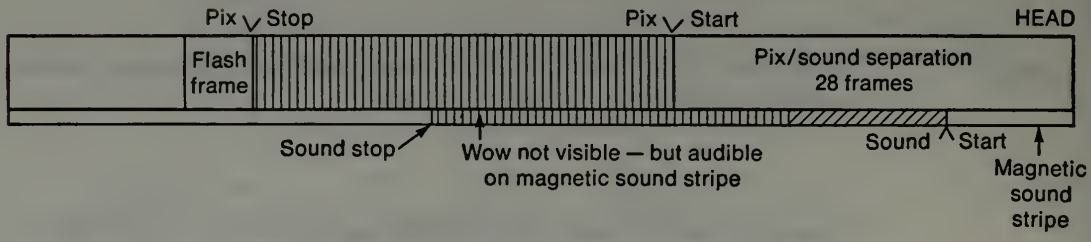


Figure B-39. Camera Slow-down Wow on Magnetic Track

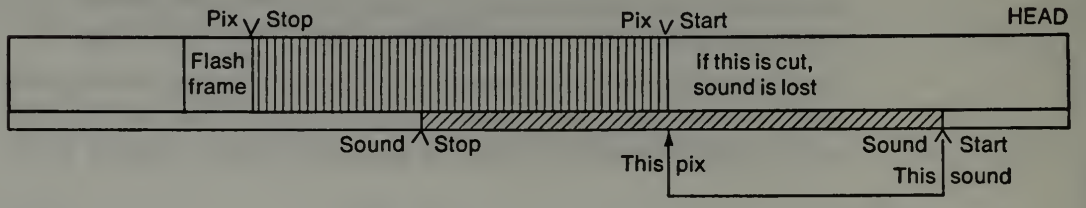


Figure B-40. Losing Head Frames of Sound Track

These are some of the problems with single-system sound-on-film cutting. Now let us consider some solutions.

Lip-Flap Cutting

This method gives you a hard choice: Leave the sound at the head of each scene, thereby keeping unwanted picture; or cut the sound track at the head of the scene in order to be able to cut to the wanted picture, thereby losing the sound that matches that picture (lip-flap). This technique is used mainly by television news film cutters when sync-sound film footage has to be cut in a hurry. This method is outlined in the following steps.

NOTE. *Always leave camera running at least 2 seconds after scene is finished. Doing this clears flash frame and track burn or wow.*

Step 1 To the head of the first scene in the assembly, attach a 13-foot leader (single-perforated stock). Mark this leader with the same data

and sync marks as you did on the double-system picture leader (see Section A-9, page 46).

Step 2 On the tail of the first scene, cut 26 (optical) or 28 frames (magnetic stripe) *after* the last sound frame but *before* the track burn of wow and the flash frame (Figure B-41).

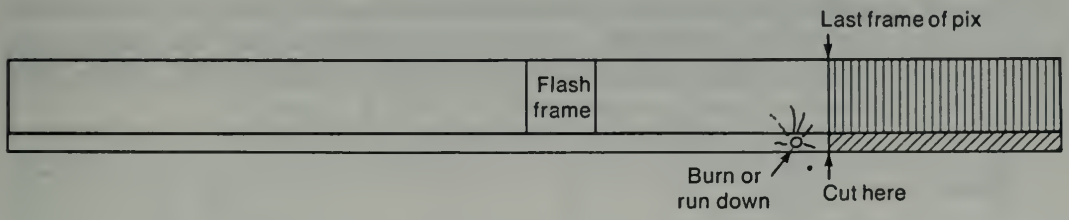


Figure B-41. Cutting Tail of Single-System Scene

Step 3 Cut the head of the second scene 1 frame ahead of the first picture frame, and splice this to the tail of the first scene, losing the extra head frame in the splice (see Figure B-42). Continue this tail-and-head cutting technique until all the scenes in your film are assembled and spliced.

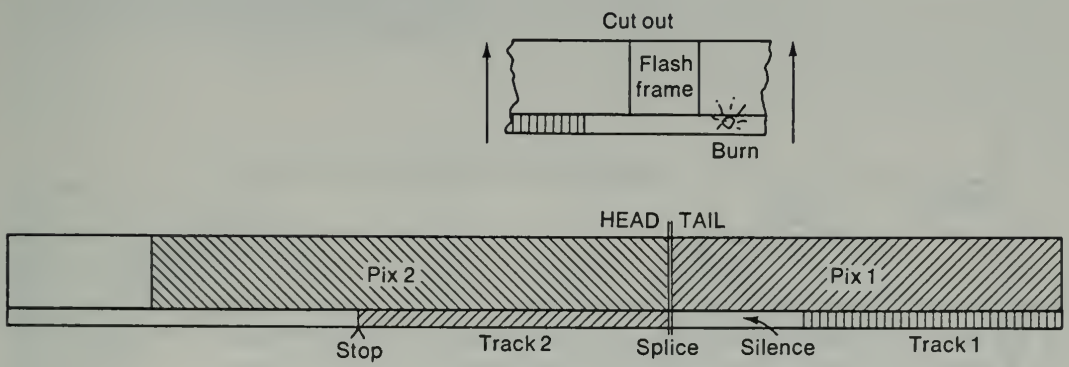
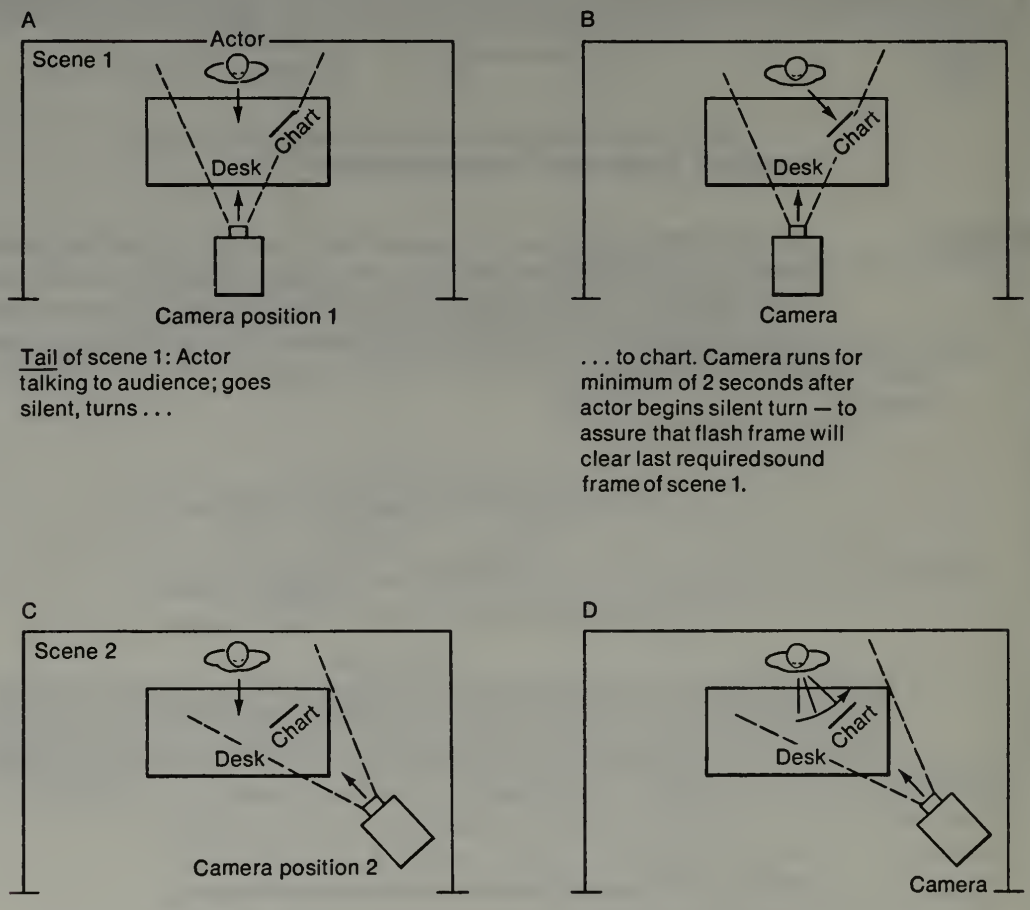


Figure B-42. Cutting and Splicing Head Scene to Tail Scene

This method, of course, cuts off the first 26 or 28 frames of sound for each scene, resulting in lip-flap for that scene. However, this lip-flap (only 1 second or so) is preferred by many news film cutters to the alternative, meaningless picture footage (which quite often shows camera movement).

Cutting on Silent Action

If the problem of lip-flap cutting lies in the cutting of the head sound track for each scene to eliminate unwanted footage, and if we put some relevant picture footage in between each scene without recording sound for that picture, we can cut on that silent action footage and preserve the sound for each scene (see Figure B-43). However, this method requires that you plan your production shooting. You must plan each scene change so that the action from a preceding scene overlaps the action in a following scene. This



Tail of scene 1: Actor talking to audience; goes silent, turns . . .

. . . to chart. Camera runs for minimum of 2 seconds after actor begins silent turn — to assure that flash frame will clear last required sound frame of scene 1.

Start scene 2 with or without final words of last speech but pick up action prior to silent turn in scene 1 — to assure that scene 1 flash frame will clear first required picture of turn in scene 2.

Continue the second scene. Cut can be made to new action during the silent turn.

Figure B-43. Shooting Overlapping Silent Action

will allow you to match the overlapping action and cut smoothly from one scene to the next. The following floor plans illustrate how overlapping silent action can be shot. Leave at least 2 seconds of silence at the tail of one scene and at the head of the next scene. This extra footage will allow the track burn or wow and the flash frame to clear wanted picture footage.

Now cutting from one scene to the next, and matching the overlapping action, becomes relatively simple, as indicated in Figure B-44. A 2-second silence between each scene, even though it is filled with action, can become very boring if it is carried on for any length of time in a film. The following suggestions will help you to vary the shots and add interest and vitality to your film.

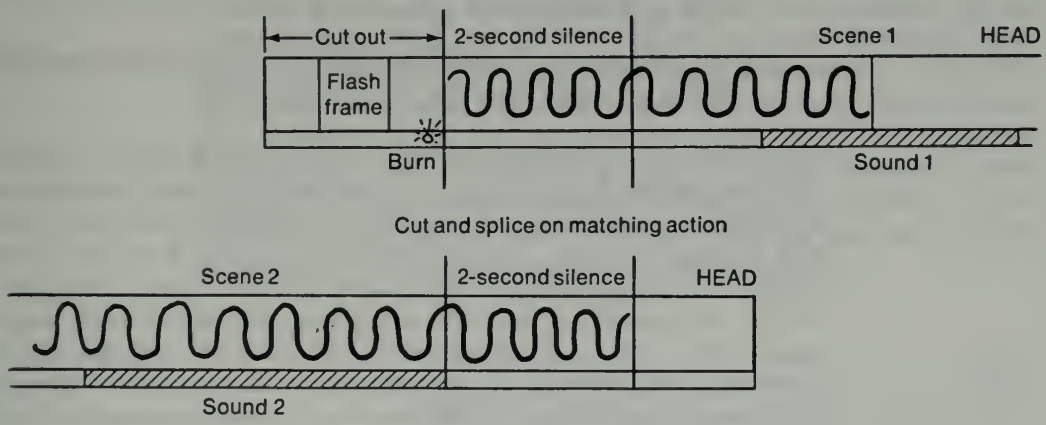


Figure B-44. Matching Overlapping Action

You can change the camera angles, use medium or close-up shots, and incorporate other devices and camera effects (such as in-camera dissolves and fades, but only during the silent period). Try inserting charts or models with off-camera narration supplied by your subject. The off-camera narration can be recorded while you photograph the insert. Be certain, however, to leave the 2 seconds of silence at the tail and the head of each cutaway shot.

Many inexpensive lip-sync films are produced using this method. For example, the small businessman, who can't ordinarily afford sound film, can use this method to make a simple inexpensive lip-sync sound film that will sell his product, communicate his ideas, or train his employees. This method does have its drawbacks, of course. It has a tendency to look wooden, and it requires a great deal of patience, concentration, and cooperation from the subject.

Here are some points to remember, during production of a film, for cutting on the silent-action method:

1 Plan each camera start and stop (each scene change).

2 Have the subject suggest moves that will be natural to him during the silent periods.

3 Do not make any noise during the silent seconds.

4 If using optical track, do not turn off the track exposure lamp during the silent seconds, since doing so will cause a whine on the track as the lamp cools.

5 Match the volume levels of each scene. Take note of the volume-indicator meter, and write down the decibel or volume unit reading for each scene.

6 Do not touch or turn off the mike during the silent seconds; doing so might cause a pop on the track.

The silent-action cutting technique may solve the lip-flap problem of single-system sound cutting, but you are still cutting the camera-original film, which will wear out under repeated projection. There is a solution, of sorts, for this problem, but only if you are using optical track single-system sound—and that is to make a dupe print of your original film. If you are using magnetic-stripe track single-system film, you must lift-off the sound from the magnetic-stripe track and transfer it to a separate sound film in order to make sync-sound dupe prints. To prepare the optical track single-system sound film for dupe printing follow these steps:

Step 1 Debloop all the splices in your film (see Section B-3).

Step 2 Attach a 13-foot leader (single-perforated) to the first scene of your film, marking it as you did the standard leader for original film rolls (see Section A-9, page 45). It is important that you mark and punch the frame that is 7 feet and 28 frames ahead of the first picture frame of your film and leave at least 5 feet of threading leader ahead of the punched sync start mark.

Step 3 Instruct the lab to make a **timed** reversal dupe print of your optical track film, with the sound printing aperture closed. Then they should print the optical track only, with picture printing aperture closed. This way, you will have the benefit of a scene-corrected picture and the best possible track exposure, resulting in better sound and picture than if both picture and sound were printed at the same time.

There is yet another technique used for cutting single-system sound on film, which requires the use of a variety of expensive television equipment. This method is mentioned for your reference only, since

you may not cut this way now; but if you seek a job in television, it may benefit you to know the method.

A&B Rolling of Single-System Sound Footage

This method is similar to 16mm checkerboarding (see page 51). But instead of printing the checkerboard-spliced A&B rolls and printing the sound, as in double-system sound printing, the television film cutter, with all of his special and expensive electronic devices, can simply splice alternating scenes on a separate roll, with an appropriate amount of black leader between each scene (see Figure B-45), and then run each roll on a separate projector (a telecine projector chain) and mix the scenes together on the video console. The scenes then appear as one continuous film, and the problem of the sound/picture displacement is resolved by having the alternating scenes on separate A&B rolls. Using a video tape recorder (VTR), the rolls can also be mixed and transferred to video tape and run later as a single roll. This method is more flexible than the others mentioned so far, since it allows for cutaways and insert shots (and live action from the television studio) to be added to the film during the mixing operation.

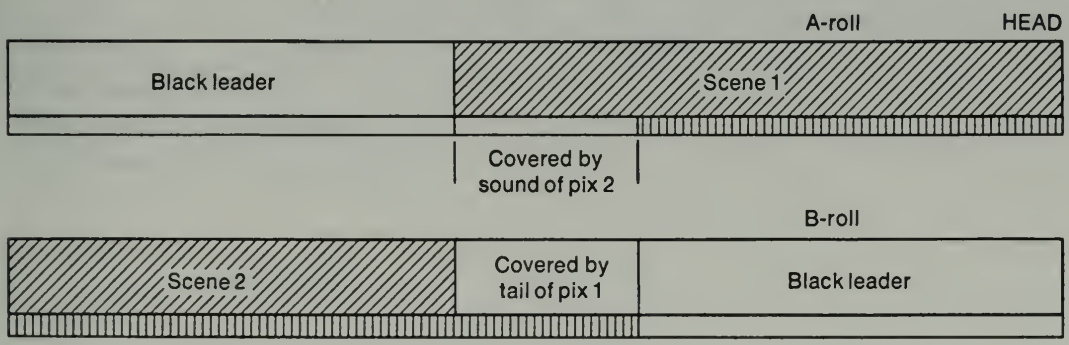


Figure B-45. A&B Rolling for Single-System Sound-on-Film

Appendix A. Sample Forms and Charts

Production No. _____

Name _____ Date _____ Time _____

Address _____ Location _____

_____ Cameraman _____

Phone _____ Remarks _____

Scene	Shot	Take	FTG	FTC	Re	Scene	Shot	Take	FTG	FTC	Re

Magazine No. Camera: Film Type:

FTG = Footage for That Shot

FTC = Exposure in Foot Candles

Re = Remarks (Good, No Good or Print)

Camera Log

CUTTING LOG Production No. _____ Date _____

Title _____ Cutter _____ Footage _____

Edge No. Head	Edge No. Tail	Footage/Frame Head to Tail	Shot Size	Action Direction	Shot/ Take	Scene Description

Cutting Log

FINAL SCENE LIST Production No. _____ Date _____

Title _____ Cutter _____ Footage _____

Footage to Start of Scene	Scene Footage/Frame	Scene Time	Time Cue	Scene Description

Final Scene List

Name _____ Course _____ Section _____ Page _____

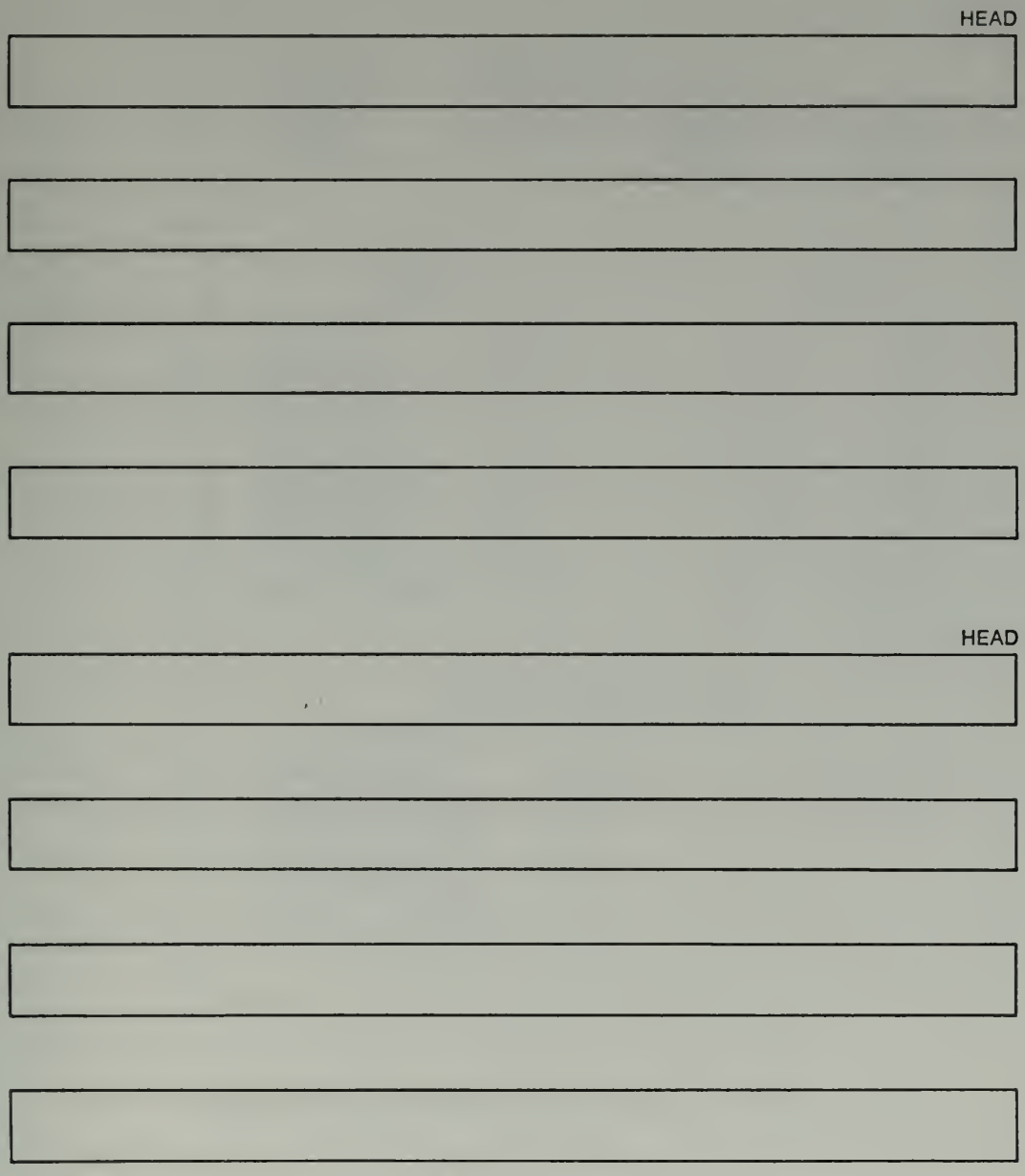
Production _____ Date _____ No. of Channels _____

Track A	
Track B	
Track C	
Track D	
Track E	

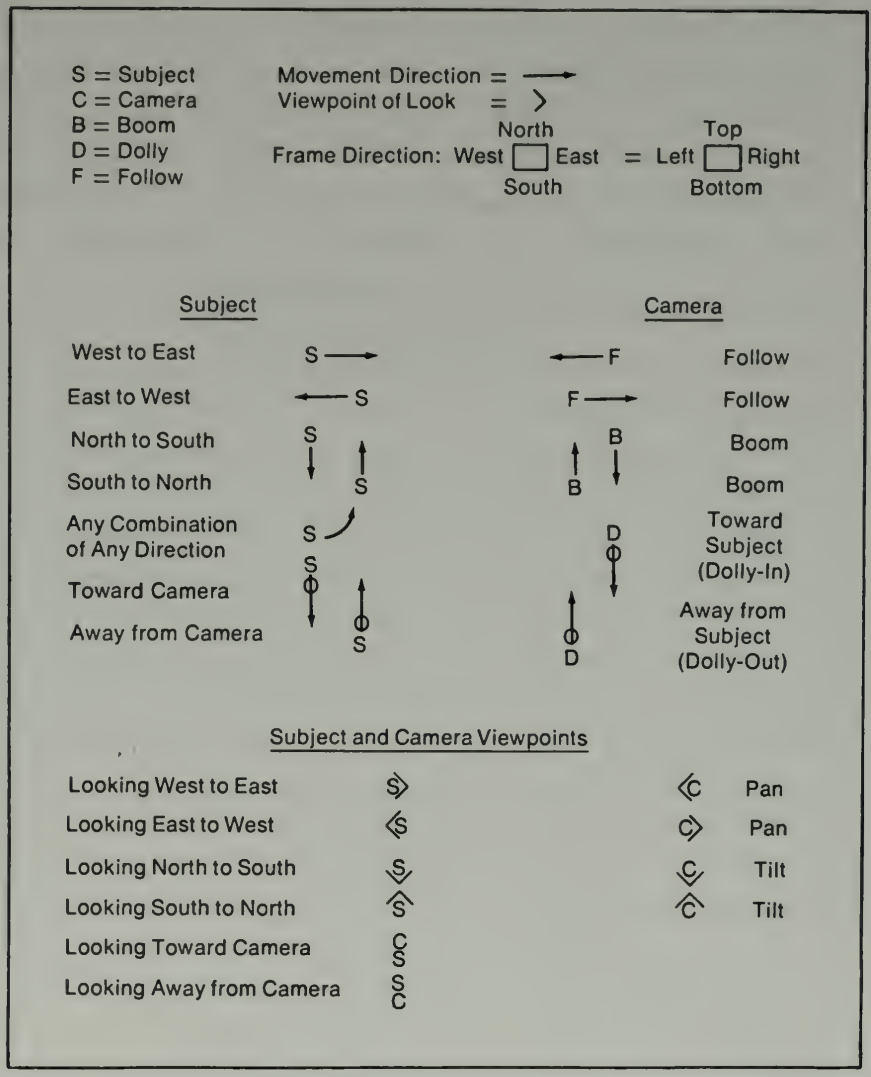
000 = sync punch < = fade-in > = fade-out ~ = sound continues (when in 2 columns = super) K| = key-off X = dissolve or seque

Start all footage count from sync punch (000) Put LARGE numbers on head and tail of effect.

Audio Cue Sheet



Cutting Plan Diagrams



Direction Symbols (for Use with Workprint Shot List or Shooting Script)

Name _____ Phone _____ Date _____

Address _____ Date Wanted _____

Film Title _____ Length _____

Number of Picture Rolls _____ Color ___ B & W ___ Sound Rolls: MAG ___ OPT ___

Type of Print or Service Wanted _____

Type of Track Wanted: Photo-print _____ Electro-print _____ Print Stock _____

Special Effects Cues

Footage/Frames to Start of Effect	Description and Length of Effect

Laboratory Printing Instructions

Timing Chart

Footage		Time		Words per Minute	Words per Minute
Feet	Frames	Minutes	Seconds	Rate = 150 WPM	Rate = 175 WPM
	1		1/24		
	2		1/12		
	3		1/8		
	4		1/6		
	6		1/4		
	8		1/3		
	12		1/2		
	16		2/3		
	24		1		
	36		1 1/2		
	40		1 2/3		
1			1 2/3	4	5
2			3 1/3	8	10
3			5	13	15
4			6 2/3	17	20
5			8 1/3	21	25
6			10	25	30
7			11 2/3	29	35
8			13 1/3	34	40
9			15	38	44
10			16 2/3	42	49
11			18 1/3	46	54
12			20	50	59
13			21 2/3	54	64
14			23 1/3	58	69
15			25	63	74
16			26 2/3	67	79
17			28 1/3	71	84
18			30	75	88
19			31 2/3	79	93
20			33 1/3	83	98
21			35	88	103
22			36 2/3	92	108
23			38 1/3	96	113
24			40	100	118
25			41 2/3	104	123
26			43 1/3	108	128
27			45	113	132
28			46 2/3	117	137
29			48 1/3	121	142
30			50	125	147
31			51 2/3	129	152
32			53 1/3	133	157
33			55	138	161
34			56 2/3	142	165
35			58 1/3	146	170

Footage		Time		Words per Minute	Words per Minute
Feet	Frames	Minutes	Seconds	Rate = 150 WPM	Rate = 175 WPM
36			60	150	175
40			66 2/3	167	195
50			83 1/3	208	244
60		1	40	250	293
70		1	56 2/3	292	342
72		2		300	350
80		2	13 1/3	333	390
90		2	30	375	440
100		2	46 2/3	417	490
108		3		450	525
110		3	3 1/3	458	538
120		3	20	500	586
130		3	36 2/3	541	635
140		3	53 1/3	583	683
144		4		600	700
150		4	10	624	732
160		4	26 2/3	666	780
170		4	43 1/3	708	827
180		5		750	875
190		5	16 2/3	792	924
200		5	33 1/3	834	972
216		6		900	1050
252		7		1050	1225
288		8		1200	1400
300		8	20	1250	1458
324		9		1350	1575
360		10		1500	1750
396		11		1650	1925
400		11	6 2/3	1668	1944
432		12		1800	2100
468		13		1950	2275
504		14		2100	2450
540		15		2250	2625
576		16		2400	2800
600		16	40	2500	2916
612		17		2550	2975
648		18		2700	3150
684		19		2850	3325
720		20		3000	3500
800		22	13 1/3	3336	3888
900		25		3750	4375
1000		27	46 2/3	4168	4860
1080		30		4500	5250
1200		33	20	5000	5832
1260		35		5250	6125
1440		40		6000	7000
1600		44	26 2/3	6672	7776
2000		55	33 1/3	8336	9720

Appendix B. Equipment and Tools

Comfort, accessibility, cleanliness, and *organization* are words that can be used to describe the desirable editing or cutting bench. Since long hours are spent at the bench, they should be as pleasant as possible; and your strength should be reserved for cutting your film, not fighting the equipment.

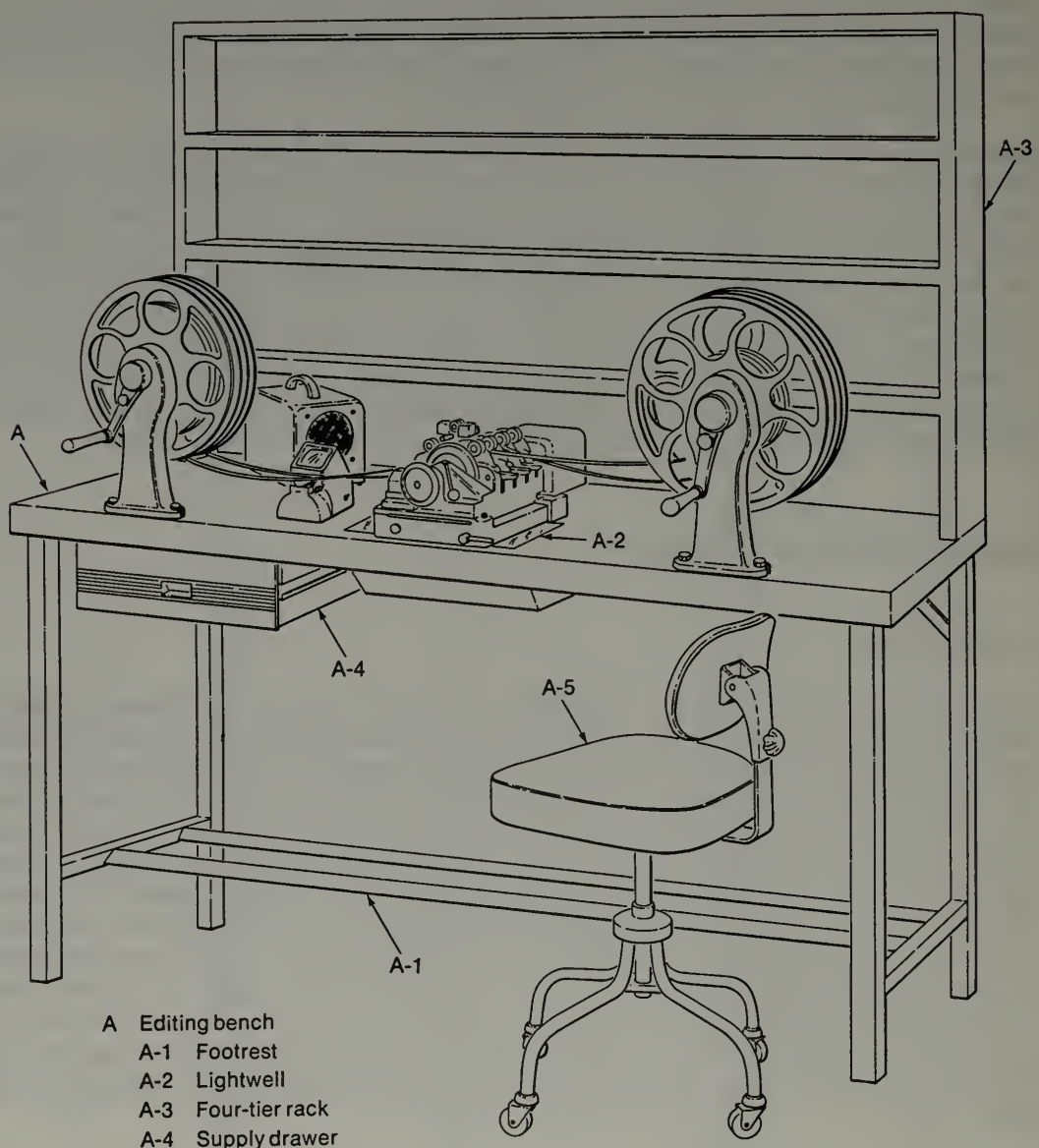
Below is a run-down on the general specifications of the basic equipment used on the editing bench, as well as a short discussion on some console types of editing machines. You will notice that there is a list of equipment following each category. This list is far from complete. It represents only equipment that I have used; therefore, the items mentioned are the only ones that I can freely suggest. The manufacturer and/or distributor is listed in parenthesis after each item. In many cases the equipment is stocked by a number of dealers, or one dealer may handle several brands and models. A list of manufacturers and dealers appears at the end of this appendix. I have divided the dealer list into geographical areas for your convenience. Contact these firms; ask for their assistance in planning your equipment purchases.

Survey of Editing Equipment

A Editing Bench

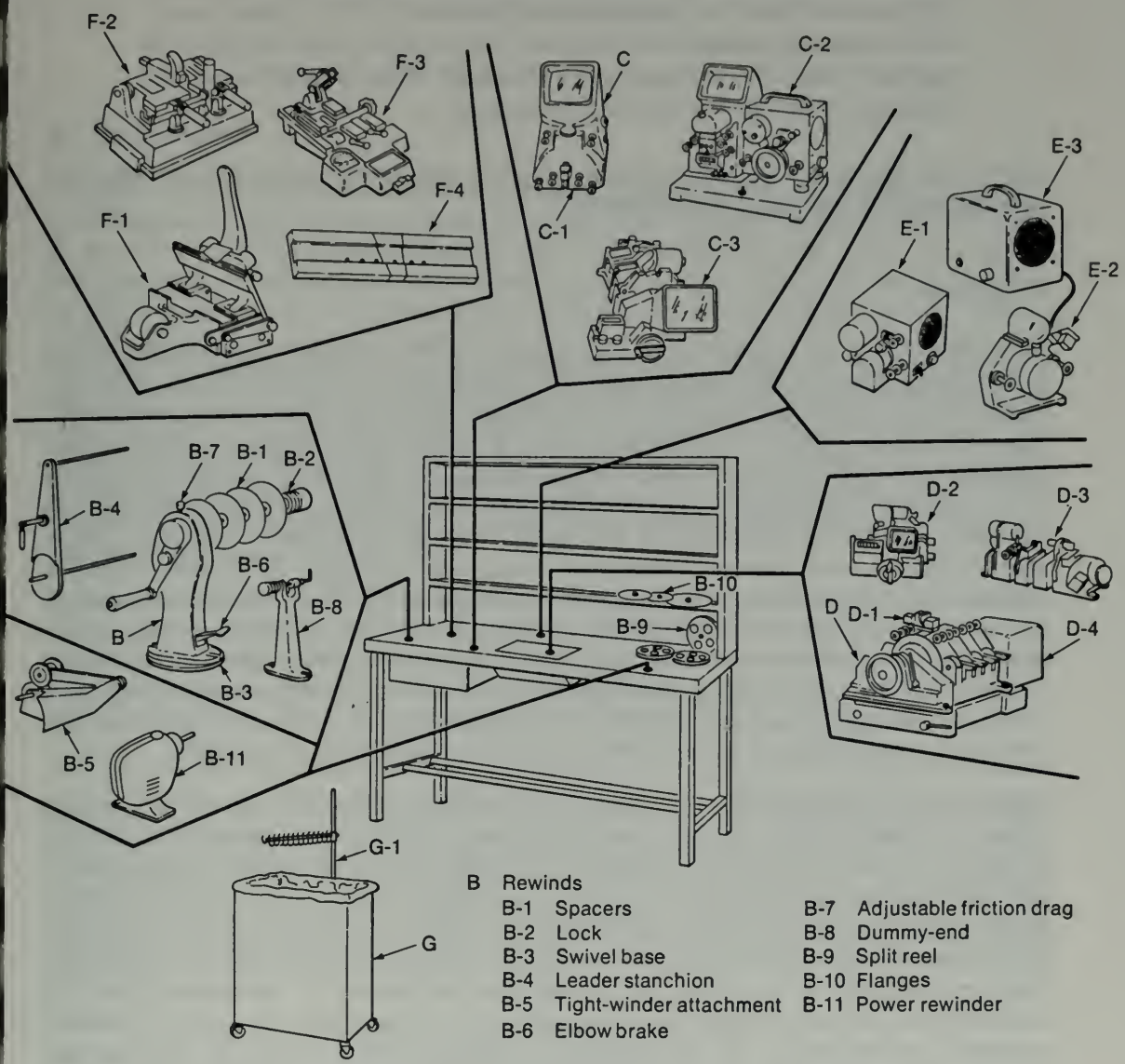
The top should be self-edged, heavy-duty Formica or similar high-pressure plastic that is chipproof, scratchproof, and crackproof. The smooth surface should be a gray color that will be easy on the eyes and easy to keep clean. The table top should be approximately 24-inches wide by 60-inches long by 31-inches high and should be supported by sturdy steel legs, with a most convenient *footrest* formed by two steel rails running between the legs (A-1). A 9-inch by 12-inch by ¼-inch frosted glass should be mounted on the top of the table to form what is called a lightwell (A-2). This lightwell should be backed by a completely enclosed reflector box, containing a low-wattage lamp and an easily handled on/off switch. Two or three electrical outlets should be mounted on top and to the rear of the table. A four-tier *rack*, for storage of film pieces and supplies, should be mounted on the back of the table top (A-3). A *supply drawer*, with dimensions of approximately 5-inches deep by 14-inches wide by 20-inches long, should be mounted on the left side underneath the table top (A-4).

Editing Chair or Stool (A-5): This piece is a most personal choice; after all, your back will be in contact with it for many hours. Generally it should be made of foam rubber, covered with Naugahyde, and supported by steel tubing. It should be adjustable in height and should have an adjustable contoured backrest.



A Editing bench
- A-1 Footrest
- A-2 Lightwell
- A-3 Four-tier rack
- A-4 Supply drawer
- A-5 Editing chair or stool

Editing Bench with Basic Equipment



B Rewinds
- B-1 Spacers
- B-2 Lock
- B-3 Swivel base
- B-4 Leader stanchion
- B-5 Tight-winder attachment
- B-6 Elbow brake
- B-7 Adjustable friction drag
- B-8 Dummy-end
- B-9 Split reel
- B-10 Flanges
- B-11 Power rewinder

C Table viewer
- C-1 Sound-reading head (in-line)
- C-2 Single-system viewer/sound reader
- C-3 Viewer/synchronizer

D Gang synchronizer
- D-1 Pickup head
- D-2 Small screen
- D-3 Synchronizer in units
- D-4 Motor-drive unit

E Sound reader
- E-1 Self-contained sound reader
- E-2 Sound reader with pickup heads only
- E-3 Separate amplifier

F Splicer
- F-1 Workprint assembly splicer
- F-2 Overlap-cement splicer
- F-3 Butt-heat-weld splicer
- F-4 Splicing block

G Film bin
- G-1 Arm structure

Editing Bench with Additional Equipment

Moviola model TLRD-1 or -2 (Magnasync/Moviola Corp.)
HFC model ETBRD-1 or -28 (Hollywood Film Co.)
J&R editing bench (J&R Film Co.)
Neumade model 55 (slightly smaller) (Neumade Products Corp.)
Precision model 101-3 (Precision Laboratories)

Chairs and stools are generally handled by the above manufacturers, or they can be obtained from office furniture stores.

B Rewinds

Rewinds are the propulsive force that carries the film through the various pieces of editing equipment. After many hours of "grinding" away with rewinds (even with motor-driven equipment, you supply the take-up power), your arm muscles can become very tired. There is no substitute for a pair of well-designed, ruggedly-built rewinds. They should have a gear ratio of at least 1 turn of the handle to 4 turns of the spindle. The housing should be cast metal (preferably aluminum); the spindle (or shaft) should be high enough to handle reels of 18 inches in diameter, and it should hold at least four of these reels along with 3 *spacers* (B-1), small reel-like objects that keep a standard space between reels to match the space between gangs of the synchronizer, and a *lock* (B-2), a device that is spring-loaded or set with a screw that keeps all the reels of film and spacers on the spindle. The rewind should also be equipped with a large, comfortable, easily turned, counter-weighted handle. A *swivel base* (B-3) can be ordered for many models of rewinds; this allows the rewind (usually left-hand one) to swivel around to feed Moviola machines.

There are several attachments and supplementary devices for rewinds, such as a *leader stanchion* (B-4), an attachment that affixes to the left rewind to hold rolls of leader or other rolls of film; a *tight-wind attachment* (B-5), a device mounted on the right rewind that allows you to roll up film lengths directly on to cores; *elbow brakes* (B-6), a most convenient device that provides the operator with a mechanical means of braking the supply reel on the left-hand rewind; an *adjustable friction drag* (B-7) mounted on one or both of the rewinds. In addition to attachments on the rewinds, there is also available an item called a *dummy-end* (B-8), a tool that resembles a rewind, except that it has no handles or gearing to move the reel. The last two items (B-7 and B-8) are helpful for handling film lengths and leaders that are to be cut into the workprint or original A&B rolls.

The reels themselves are designed in three basic types: (1) *split reel* (B-9), aluminum—do not bother with the plastic models (these reels come apart at the hub and are fitted so as to hold plastic film cores—very handy devices for rolling up lengths of film to be stored, since no reel is required to hold the film); (2) *flanges* (B-10), aluminum and micarta—a sort of half split reel, which is used to roll up film lengths—used mostly in the flat-table editing console (see page 167). (3) The *take-up reel* (aluminum, steel, and plastic)—quite the conventional reel, available in sizes ranging from 100 feet to 2,000 feet (you should use only the type that has a square hole on both sides of the reel, allowing you to mount the reel on the rewind spindle or projector from either side). *Power rewinders* (B-11) are also available, but are used mainly for fast rewind of projection prints.

Moviola model WDS-16 or WDUS-16 (Magnasync/Moviola Corp.)
Ediquip model 1004 or 1005 (J&R Film Co.)
Neumade Dynamic model 4 reel (Neumade Products Corp.)
HFC 4-reel model (Hollywood Film Co.)

C Table Viewers

The table viewer should be a well-constructed, relatively heavy (so it won't "creep" on the table), smooth-operating piece of equipment. The screen should be a minimum of 2½ by 3½ inches and well lighted, with a sharp image from edge to edge on the screen. It should have an image-focusing device and a framing device. The film gate (the area from which the image is projected) should be smooth and chromium-plated and should contain a device for marking (or notching) the film frame that is in view on the screen. The shutter that produces the illusion of movement when the film is run through the viewer should be a rotary prism. The viewer should be equipped with a switch that turns the lamp off when the gate is opened or with a separate switch that will operate the lamp when needed. The lamp housing should be readily accessible for changing and cleaning the lamp. The lamp itself should be an easily obtained, standard type. All mirror surfaces and lenses should be accessible for cleaning and adjustment.

The table viewer is not a substitute for a projector; the small screen size and the uneven film movement (unless it is equipped with a motor unit or driven by a motorized synchronizer) produces a substandard image. However, for preliminary scene checks and picture spotting, and even for syncing the dailies (see page 84), the table viewer equipped with an *in-line sound-reading head* (C-1) can be very handy.

The table viewer is available in a variety of models and brands; *single-system viewer/sound readers*, in which the viewer and sound reader are mounted on a base with the correct separation for single-system picture and sound-on-film (C-2) and *viewer/synchronizer combinations* (C-3) are also available. Be certain to try out any table viewer you may want to buy. Take along a reel of film that has been projected and that you know has a sharp, steady image. Some viewers mask off a portion of the frame (this is not so bad in itself, as long as you know how much of the frame is lost).

Maier-Hancock Professional 16mm (Maier-Hancock Co.)
Zeiss Moviscop 16mm (Zeiss-Ikon Optical Co.)
Moviola model M50 (Magnasync/Moviola Corp.)
Precision model S16jr (Precision Laboratories)
Craig Pro-16 V-46, or V-16 (sold by most of the listed dealers)

Single-system viewer/sound reader combinations:
SOS Ediola 16mm (SOS Photo-Cine-Optics)
16mm Magniola double- or single-system (SOS Photo-Cine-Optics)

D Gang Synchronizer

The gang synchronizer* is one of the film cutter's most used tools; consequently, as with all editing equipment, it should be constructed to withstand constant, hard

*For pointers on the use of the gang synchronizer, see Section A-2.

use. The frame (preferably aluminum) should be open at the base to permit illumination of the film when operated over a lightwell. The steel main shaft should turn on sealed precision ball bearings. The film-guide (retaining) rollers should be equipped with self-lubricating bearings. A means for adjusting the space between the film-guide rollers and the sprocketed gangs should be provided. All parts on the gang synchronizer should be accurately machined to allow replacement of broken or damaged parts (synchronizers should be sent back to the factory for major repairs). Those surfaces that contact the film should be smooth and so machined that only the edges of the film are contacted. All exposed parts should be coated or enameled in a chip-resistant and noncorrosive finish. Frame counters should move easily but not freely, and footage counters should be designed to allow them to reset to zero. The lock (brake), when applied, should keep the gangs from moving.

Gang synchronizers can be designed (that is, ordered at a cost increase) to fill almost any special requirement: to count frames only (from 0 to 9999 or more); to count seconds and tenths of seconds (for close-scene timing); or to total seconds, minutes, and hours. You can request a clutch that disengages the shaft between each gang or any combination of super 8mm and 16mm and 35mm gangs, that will hold all the films in edit-sync. Magnetic sound and/or optical sound *pickup heads* (D-1) can be mounted on one or all gangs. One brand of synchronizer (Pic-Sync) can be ordered with a *small screen* (2⅛ × 1½ inches) on one or more gangs (D-2). Still another model (Precision) can be purchased in *units* (D-3), so that more gangs, sound pickup heads, or other attachments can be added later. Most synchronizers on the market today can be equipped with *motor-drive units* (D-4); these units either attach directly to the synchronizer or are mounted on a common base (and when so mounted are called *sync blocks*). Combinations of synchronizer, viewers, sound readers, and drive units can be mounted on a single base, thereby providing a set of cutting equipment that is always ready and easily used.

Moviola SZD (Magnasync/Moviola Corp.)
Neumade 4-sprocket (Neumade Products Corp.)
HFC 4-sprocket (Hollywood Film Co.)
Precision model 4 (Precision Laboratories)
Pic-Sync model P-4-F (SOS Photo-Cine-Optics, distributor)

Combinations:
16mm Magniola model MB-16 (SOS Photo-Cine-Optics)
SOS Ediola (SOS Photo-Cine-Optics)
16mm Projectola, model 31 (SOS Photo-Cine-Optics)

E The Sound Reader

The sound reader is available in two basic types: (1) *self-contained* (E-1)—magnetic and optical heads, plus amplifier; and (2) the *pickup heads only* (E-2)—this type is used in combination with an existing amplifier.

The self-contained type should be equipped with both optical and magnetic pickup heads. The amplifier should be at least 4-watt with a fused circuit. These sound readers are available in models that will read either left-to-right or right-to-left. The

choice of direction should be made to match the direction of your synchronizer and table viewer. Models are also available that read the magnetic film with the base up (handy—because this will allow you to mark the track on the base side).

The advantage of the second type is that it takes up very little room on an already crowded editing bench. In some cases it will be less expensive because it does not contain the amplifier. The purchase of the second type should be considered if you have already equipped the bench with a *separate amplifier* (E-3) that is connected to a sound pickup head mounted on the synchronizer (D-1).

Both types should have well-balanced sound drums and flywheels. They should also be equipped with track position (edge-track, or center track) and film- or tape-thickness adjustments.

Some sound readers can be ordered with attachments that will read ¼-inch tape; this makes the culling (pre-editing) of tape tracks very convenient. Most of the self-contained models can be purchased with a platform on the top which will support a table viewer (such as the Moviscop). This arrangement will allow the sound head to be positioned directly over the picture aperture or in-line between the picture and the track for syncing dailies.

Self-contained sound readers:
Precision model 700 or 800 (Precision Laboratories)
McMurry model 158A5 (SOS Photo-Cine-Optics)
Satellite model SMSR (Satellite Film Service)

Pickup-heads-only sound readers:
Magnasync/Moviola model SRM (magnetic only) (Magnasync/Moviola Corp.)
Magnasync/Moviola model SRC (optical and magnetic) (Magnasync/Moviola Corp.)

F Splicers

Splicers should be divided into two separate types according to the job they are designed to perform: (1) the *workprint assembly or film repair type* (F-1), usually perforated or nonperforated tape splicers; and (2) the *checkerboard or A&B rolls type*—overlap-cement (F-2) or butt-heat-weld splicers (F-3). The A&B rolls type of splicer can be used for assembly of workprint or the repair of film, but the tape splicer should not be used for film that is to be printed. (For a discussion of the advantages and disadvantages of the various types and models of splicers, see Section A-1.)

A very convenient, portable, and inexpensive splicer is the *splicing block* (F-4). This tool is simply a channeled block of aluminum, with straight and diagonal cutting guides and registration pins to hold the film in proper relationship for a frame-line splice. It can be used for workprint assembly and the splicing of sound track. The perforated tape used with this block is available in rolls or individual per-splice pieces (Presstapes).

Workprint assembly and film repair splicers:
Guillotine model M2-16mm-2T (all dealers)
Rivas D-16mm (all dealers)

Quik model 8/16mm (SOS Photo-Cine-Optics)
HFC model TSD-16 (Hollywood Film Co.)

Splicing blocks:
Ediquip model 1060 (J&R Film Company)
Birns and Sawyer model 16 (Birns and Sawyer)
Most dealers handle one or more models

A&B rolls splicer:
Maier-Hancock hot splicer model 816 or 1635 (Maier-Hancock Corp.)
Stanco Mark IV (most dealers)
Griswold model R-3 (most dealers)
Presto model 16, butt-heat-weld (most dealers)

G Film Bins (trim bins)

The bin (G) should be constructed of heavy-gauge steel riding on full-swivel casters. The liner fabric should be a strong but soft, pliable drill cloth that is washable. The *arm structure* (G-1) should be removable and adjustable. The film-holding hooks should be of spring steel and movable along the length of the arm structure.

Ediquip model 1016D (J&R FIlm Co.)
Laumic model FB90S (Laumic Co.)
Moviola model TBH-1 (Magnasync/Moviola Corp.)

H The Moviola Editing Machine

Long considered the standard editing machine, the Moviola is a versatile, time-saving editorial tool. It allows the film editor to make judgments about synchronization between picture and sound, breaking down dailies, analysis of scenes for juxtaposition, and quick previews of cut scenes. The Moviola machine, due to its small screen size, is not a substitute for the projected image. However, the machine is equipped to run at a constant speed of 24 frames per second or at a variable speed, thus making the preview of scenes for timing and content a quick and easy job.

There are so many models of this machine, so that it is next to impossible to list them all. The Moviola is available in a simple motor-driven, picture-only table model up to a complex machine with two picture heads and two or more sound heads. The machine is capable of reading optical and/or magnetic sound in edit-sync with the picture, and accessories are available (magnetic search head and manual search head) that will allow the sound track to be moved independently from the picture film. A clutch that connects the picture head and the sound head can be easily put into drive or taken out of drive.

Since the Moviola editing machine is a major investment, care should be given to the model and the accessories wanted before buying. However, the machine is so designed that its modular construction permits the later addition of many accessories. These machines may also be rented and leased from most distributors.

Moviola film-editing machine, Series 20 (Magnasync/Moviola Corp.)

I Horizontal Flat-Bed Editing Systems

These editing systems (tables) are a pleasure to use. They are quick and easy to thread (featuring straight-line threading). They use a refined system of rotating prism for picture projection that allows the film and sound track to run at speeds from zero up to 120 frames per second or at a constant speed of 24 frames per second. These speeds can be run both backwards and forwards. Some machines also feature instant stop on a frame, with full protection for picture and sound films. The projection screen size is approximately 6 inches by 8 inches on the various models. One machine (the KEM), is available with up to three picture heads and four sound heads. The picture and sound heads are interchangeable between 16mm and 35mm, or combination models can be ordered. The sound amplifiers produce good quality sound (due to a continuous, straight-line path in threading), and the *volume* controls (excepting the SOS/Provost) are of the straight-line sliding type. The footage and frame counters of these machines are controlled by electronic means and can be ordered to include direct read-out into hours, minutes, and seconds.

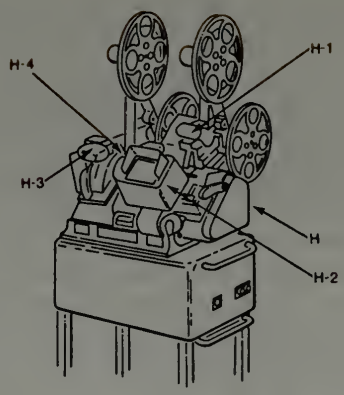
These machines are expensive, but they can be leased or rented from most dealers or suppliers.

KEM (Keller editing machine) (Electronic Mechanic Corp.)
Moviola console editor (Magnasync/Moviola Corp.)
SOS/Provost (SOS Photo-Cine-Optics)
Steenbeck film-editing table (General Enterprises)

J Interlock Projectors (Double-System)

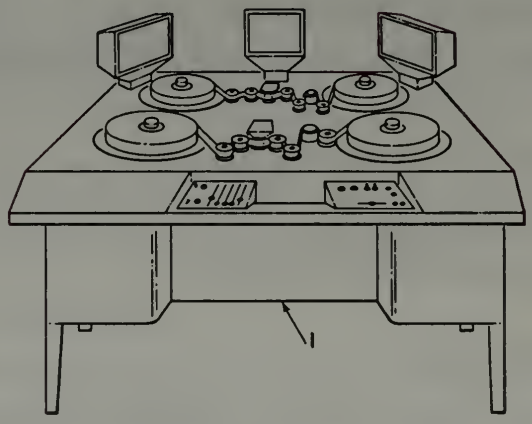
The double-system projector (J) offers the 16mm filmmaker a professional interlock system at a relatively low cost. The machine may be used for interlock projection of optical or magnetic composite prints and a separate magnetic track. It may also be used for any combination of the following: (1) re-recording, (2) dubbing, (3) lifting off sound from an optical or magnetic single-system film and re-recording it onto a separate magnetic track for double-system (see Lifting Off Single-System Sound, Section B-14), (4) recording multi-lingual sound tracks, or (5) providing composite prints with a foreign language track (this requires the application of a half-track magnetic stripe along the existing optical track), and (6) making trial mixes onto the separate magnetic film in perfect synchronism. What might be the most important feature of all is the fact that these machines are portable and can be taken to any location where power is available or can be supplied from a generator.

These machines are available in center or edge-track models. Both provide the same quality of sound, the only difference depending on what your laboratory can reproduce. Special equipment, such as synchronous motors (allowing the machine to run in-sync with other synchronous dubbers, etc.), variable-speed attachments, and frame counters, is available. The double-system projector should be equipped with a low-voltage, Halogen light source in order to produce a brilliant screen image and at the same time protect the picture film. It should also provide for still-frame projection. The projector should have a minimum reel capacity of 2,000 feet.

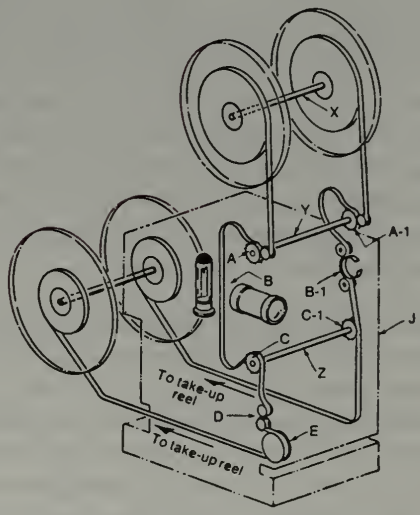


H-1 Composite sound heads
H-2 Picture heads
H-3 Separate sound heads (both optical and magnetic)
H-4 Manual search head

Moviola Film-Editing Machine



Horizontal or Flat-Bed Editing System



A Upper sprocketed drive wheel
A-1 Upper sprocketed drive wheel
B Picture frame, projected
B-1 Matching sound frame on magnetic pickup head
C Lower sprocketed drive wheel
C-1 Lower sprocketed drive wheel
D Dampening rollers, to smooth sound track on film
E Sound drum; optical/magnetic pickup heads
X Reel interlock shaft
Y Interlock shaft
Z Lower loop drive axle

Interlock Projector (Double-System)

Besides all the special applications of these projectors, they also provide good screen images for checking the workprint and can double as a regular screening projector for composite prints.

One brand (Siemens double-16 sound projector) has been superseded by the Sonorex double-16 interlock projector. Both of these projectors are distributed by the same firm (Arriflex). I mention the older model, in case you can find a used one in good condition at a reasonable cost.

Bauer P-6 interlock (Allied Impex Corp.)
Siemens 16/16 sound projector (Arriflex Corp. or from most distributors and dealers)
Sonorex 16/16 interlock projector (Arriflex Corp.)
Palmer interlock projector (W. A. Palmer Films)

List of Editing Tools

1 Reddy-eddy 8/16mm film computer: Provides a quick and easy method for obtaining information about footage, screen time, minutes, seconds, and frame count.

2 Magnetic erasing pencil: Can erase limited areas of magnetic track, such as a syllable or part of a word. Active area of tip is ¼ inch.

3 SOS Film-nipper: One-hand, spring-operated scissors. SOS non-magnetic scissors, model B-0, for cutting magnetic tape and track.

4 Round-hole sync punch.

5 Single-edge razor blade or X-acto knife with a number-11 blade: Several graphic arts knives are available that are handy for editing.

6 Rapidographic pen. A quick-drying ink pen, which is of utmost help in editing. Get the number-0, extra-fine line tip.

7 Presstapes, available in 8mm and 16mm (double-sprocket only): Perfect for assembling workprints. For maximum ease in use, pick up a simple splicer, such as the Baia Bantam 8/16mm splicer.

8 Magnifying glass, 8 to 10 power: Graphic arts supply houses carry a variety. Useful for spotting a frame location and reading edge-numbers. Should be at least 1-inch in diameter.

9 Set of printing leaders: Include one each of the picture head and tail and of the sound-track head and tail. Use these in preparing your production printing leaders. Just run them in the synchronizer as a guide in making new leaders.

10 Pressure-sensitive adhesive tapes, such as: Scotch Brand Magic Tape, ½ to ⅜ inch; Double-Stick Tape, ½ inch; white paper tape, ⅜ inch; double-/or single-perforated mylar splicing tape.

11 Sync beeps, ¼-inch, pressure-sensitive, 1000-cycle tone signals: For use on sound-track head leaders.

12 Blooping punch, blooping pen, and blooping ink.

13 Grease pencils, such as Listo brand (red, yellow, and black leads).

14 Pressure-sensitive adhesive labels, such as Kum-Kleen labels (5/16-inch × ½-inch size).

15 Waterproof felt-tip pens (red, yellow, and black; small tip).

16 Scriber (steel, the type with reversible point that fits into handle).

Manufacturers and Importers

Allied Impex Corporation
168 Glen Cove Road
Carle Place, NY 11514

Arriflex Corporation of America
25–20 Brooklyn-Queens Expressway West
Woodside, NY 11377
and
1015 Chestnut Street
Burbank, CA 91502

Birns and Sawyer, Inc.
6424 Santa Monica Boulevard
Los Angeles, CA 90038

Ediquip Corporation
(*see* J&R Film Company)

Electronic Mechanic Corporation (KEM)
630 Ninth Avenue
New York, NY 10036
and
KEM Hollywood, Inc.
6253 Hollywood Boulevard
Hollywood, CA 90028

Hollywood Film Company
956 Seward Street
Hollywood, CA 90038

J&R Film Company
905 Cole Avenue
Hollywood, CA 90038

Laumic Company, Inc.
35 West 45th Street
New York, NY 10036

Magnasync/Moviola Corporation
5539 Riverton Avenue
North Hollywood, CA 91601

Maier-Hancock Company
13212 Raymer Street
North Hollywood, CA 91605

Neumade Products Corporation
720 White Plains Road
Scarsdale, NY 10583

W. A. Palmer Films, Inc.
611 Howard Street
San Francisco, CA 94105

Precision Laboratories
(Division of Precision Cine Equipment Corporation)
894 East 51st Street
Brooklyn, NY 11203

Satellite Film Service
P.O. Box 6476
San Jose, CA 95150

SOS Photo-Cine-Optics, Inc.
(Division of F&B/CECO Industries, Inc.)
311 West 43rd Street
New York, NY 10036
and
7051 Santa Monica Boulevard
Hollywood, CA 90038

Zeiss Ikon-Voigtlander of America, Inc.
444 Fifth Avenue
New York, NY 10018

Dealers and Suppliers

NOTE: If there is not a listed dealer near you, write the manufacturer for the name of a dealer in your area.

West

Birns and Sawyer, Inc.
1026 North Highland Avenue
Los Angeles, CA 90038

Brooks Cameras, Inc.
45 Kearny Street
San Francisco, CA 94108

F&B/CECO, Inc.
7051 Santa Monica Boulevard
Hollywood, CA 90038

Adolph Gasser, Inc.
5733 Geary Boulevard
San Francisco, CA 94121

Gordon Enterprises
5362 Cahuenga Boulevard
North Hollywood, CA 91601

J&R Film Company
905 Cole Avenue
Hollywood, CA 90038

East

Camera Mart, Inc.
456 West 55th Street
New York, NY 10019

F&B/CECO, Inc.
315 West 43rd Street
New York, NY 10036

Ferco Film Equipment Rental Company
419 West 54th Street
New York, NY 10019

General Camera
471 11th Avenue
New York, NY 10018

MPCS (Motion Picture Camera Supply, Inc.)
424 West 49th Street
New York, NY 10019

Producers Rental Corporation
22 West 46th Street
New York, NY 10036

Midwest

Behrend's, Inc.
161 E. Grand Avenue
Chicago, IL 60611

F&B/CECO, Inc.
4019 Prospect Avenue E.
Cleveland, OH 44103

Victor Duncan, Inc.
155 Ohio Street
Chicago, IL 60611

North

Cinevision
2000 Northcliffe Avenue
Montreal 260, Quebec, Canada
and
244 Simcoe Street
Toronto 5, Ontario, Canada

South

Calvin Cineequip, Inc.
215 West Pershing Road
Kansas City, MO 64108

CineMatrix
204 16th Street N.W.
Atlanta, GA 30318

Cine Tech, Inc.
801 N.W. 111th Street
Miami, FL 33168

F&B/CECO, Inc.
51 East 10th Avenue
Hialeah, FL 33010
and
140 Spring Street
Atlanta, GA 30303
and
1314 Powhatan Street
Alexandria, VA 22314

England

Cine-Europe Ltd.
89–91 Wardour Street
London W 1, England

Samueison
303–305 Cricklewood
London NW 2, England

France

Chevereau
20 rue de la Chine
Paris, France

Italy

Elemack
Via Poggibonsi 15
Rome, Italy

Bibliography

Richard D. Mitchell
1724 Mira Vista Avenue
Santa Barbara, Ca. 93103

Books devoted primarily to *creative* film editing:

John Burder. *Technique of Editing 16mm Films.* New York: Hastings House, 1968.

Karel Reisz and Gavin Millar. *Technique of Film Editing*, rev. ed. New York: Hastings House, 1968.

Books devoted primarily to *physical* film editing:

Recommended Standards and Procedures for Motion Picture Laboratory Services, rev. ed. Washington, D.C.: Association of Cinema Laboratories, 1966.

Ernst Walter. *Technique of the Film Cutting Room.* New York: Hastings House, 1969. (The scope of this book is that of the major studio production of large-scale films. The procedures outlined and equipment used may be too sophisticated for the typical school film department.)

Books with chapters on, or some mention of, both *creative and physical* film editing:

American Cinematography Manual, 2nd ed., American Society of Cinematographers, 1968.

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Lee R. Bobker. *Elements of Film.* New York: Harcourt Brace Jovanovich, 1969.

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Glossary

Abbreviations

Amp. Amplifier, or amperes

ASA American Standards Association, regulatory body for standards, U.S.A. adopted speed index of film stock (raw stock)

B.G. Background, refers to distance in picture and sound, also used to express a feeling of less than, as in "under"

B/W Black and white

d. Density, the degree of opacity in the photographic image

Day Daylight, as used in script. Color temperature of film

db Decibel, 1/10th of a Bel, a unit of measurement for sound

D.I. Dolly-in

Dia. Dialog, as in script. Diameter (measure). Diaphragm (microphone)

Diss. Dissolve

D.O. Dolly-out

Dub. Dubber, as in machine, Dubbing; as in re-recording

Dupe. Duplicate, picture or sound

EN Edge-number

EQ. Equalize, to change the characteristics of sound. Equalizer, the device that accomplishes this

Exp. Exposed, or exposure

Ext. Exterior, as used in script

F.I. Fade-in

F.O. Fade-out

F.P.S. Frames per second, or more aptly pictures per second (P.P.S.)

Freq. Frequency

f/Stop Focal/length, relative aperture of lens; focal length divided by effective aperture of lens

FX Effects, sound effects, optical effects

H.F. High frequency

Hot. Sound: too loud, picture: too contrasty, overexposed

Hz. Hertz (Heinrich R., 1857–95), discovered electromagnetic wave (radio); replaces the term "cycle" as unit of measurement for frequency

INT. Interior, as used in script

ITN. Internegative

L.F. Low frequency

L.I.N. Latent-image key number

Mag. Magazine (film), magnetic, magnetic sound film

Mod. Modulated, with signal

M.S. Master scene, master shot

Narr. Narration

Neg. Negative

Night Night, as in script

N.G. No good, refers to a bad or unsuitable take

Opt. Opticals or effects done on optical printer, optical track

Orig. Original film or sound track

Pix. Picture

Pos. Positive, refers to type of film stock, or print stock

Pot. Potentiometer, or volume control; pot-in (fade-in); pot-out (fade-out) as in sound mix

P.O.V. Point of view, i.e., from the subject's viewpoint

Proj. Projector

Rev. Reversal camera film, reverse shot (from another P.O.V.)

Shot Size:

CU	Close-up	LS	Long shot	MLS	Medium long shot
ECU	Extreme close-up	MCU	Medium close-up	MS	Medium shot
INS	Insert shot				

S/N Signal to noise ratio, refers to volume of signal (usable sound) to the noise generated by recording system, expressed in db

Super. Super-imposition or double-exposure, the latter is preferred

Sync. Synchronous, synchronism, synchronizing, gang synchronizer

T Transmission, transmission stop—actual light value passed through the optics of a lens; transparent part of a photographic image (inverse of density), *T*-marks in cutting

Unmod. Unmodulated, no sound or signal

V.I. Volume indicating meter, same as V.U.

VTR Video tape recorder or recording

V.U. Volume units; volume unit meter; a sound loudness scale

W/P Workprint

X Refers to a subject position, a cutting mark, and sometimes to a number of frames, as in 32 X or 32 frames

Z.I. Zoom-in

Z.O. Zoom-out

Terms

A&B Rolls (A&B Rolling) (See Section A-8. See also *Conformation.*)

Academy Leader A leader, standardized throughout the industry, which is placed at the beginning (head) and the end (tail) of all release-print reels to provide threading and other information useful to a projectionist. Named after the Academy of Motion Picture Arts and Sciences.

Answer Print The first print made by the laboratory for the filmmaker to look at and listen to, so that he may approve it as printed or make further changes (See Evaluating the First Answer Print, Section B-13).

Anvil The part of a splicer that holds the film pieces in proper registration. Also supports film for scraping, as in the case of overlap-cement splicer. (See the splicer diagram, page 8.)

Assemble To carry out the first step in film editing, which is to collect together the required shots and join them in a trial screen order, thus producing a rough cut. (See also *Rough-Cut* and *Fine-Cut.*)

Beep Tone A modulation or tone put onto sound track in sync with the fogged frames of the camera-original film. The system that lays this tone is called *automatic,*

or *electronic, clapstick*, and it starts automatically when the camera and recorder are turned on. Normally, there are 4–7 fogged picture frames with an automatic clapstick, with the last fully fogged frame sync'd to the start of the tone.

Bin A clean and usually fire-resistant container for film, which is kept in cutting rooms and other rooms where film is handled. Scrap film is dumped in a waste bin.

Bloop The noise (or "pop") generated in the film sound reproducer by the passage of a splice (or some other interruption) in a piece of optical sound track. The noise is produced by a sudden and unwanted modulation of the light beam, which is caused either by the greater density of the splice or by a transparent line resulting from overscraping the emulsion at the splice. The word *bloop* describes the patch, fogging mark, painted area, or punch mark by which this unwanted noise is rendered inaudible, and the process of applying the bloop is called either *blooping* or *deblooping*, the meaning of the two terms being similar. On magnetic sound tracks that are spliced diagonally, deblooping is for the most part unnecessary (such a small area of the splice crosses the playback head at any one time that no bloop is heard). However, bloops will occur on magnetic tracks when the tracks are brought into contact with magnetic editing tools. This type of bloops can be removed by using either a pencil-tip demagnetizer or a special circuit on some sound dubbers (see Splicing and Deblooping Sound Tracks, Section B-3).

Breaking Down The process of breaking apart a roll of film into its component shots. The term is usually applied to dailies, when a single roll of picture or sound may contain many separate scenes and takes. It is also applied to the camera-original film during the process of conforming it to the workprint.

Camera Log A data sheet filled out by the assistant cameraman, sound recordist, etc., listing all the shots and takes that have been made. It contains technical information that will be needed by the laboratory and the cutter. It also becomes a record of mistakes and oversights, particularly useful for the film student.

Camera-Original Film See *Original Film.*

Checkerboard Technique See Section A-10.

Cinch Marks Lateral scratch marks on the emulsion side of a piece of film, made by winding a roll of film too tightly or by pressing down on its sides.

Clapboard Same as *Slate Board.*

Clapsticks Same as *Slate Board.*

Code Numbers Sequential identification numbers ink-printed at intervals of 16, 20, or 40 frames along the edges of synchronized picture and sound workprints. These code numbers provide sync marks from the head to the tail of a reel; they should not be confused with *Latent-Image Key Numbers* or *Edge-Numbers*, which are defined elsewhere.

Composite The marriage on one piece of film of corresponding sound and picture images, either in editorial or projection sync. (See ACL Handbook, pages 28–44, for the various types of composites.)

Conformation, Conformer The process by which the camera-original film is cut into

a frame-to-frame copy of its workprint. The original film is conformed to the workprint by using the guidelines of (1) the latent-image key numbers that are printed through onto the workprint from the original film or (2) the matching ink-printed edge-numbers that the filmmaker has printed on both films by the lab. In 16mm film, the conforming process terminates in the A&B rolls (see *Checkerboard Technique*). Conformation is also called *negative cutting* when the camera-original film is negative. A *Conformer* (negative cutter) is one who practices this art.

Core A plastic or metal center upon which film stock is wound and stored.

Culling The process of weeding out unwanted takes or scenes from the original film before dailies are printed.

Cut An immediate change from one shot to another shot. This screen effect is created by splicing the two shots together. The cut is the base of many of the creative powers of the film and is primarily responsible for the ability of film to construct a new framework of time and space. "Cut" is also a command used to end a shot during film production.

Cutaway A visual or aural effect in which attention is transferred from the main action to a secondary action that relates to or comments on the main action even though it is seemingly separate from that action. A sort of filmic aside.

Cutting Copy Same as *Workprint* or *Worktrack*.

Cutting Sync Same as *Editorial Sync*.

Dailies Prints made from camera-original film and/or original sound track for the purpose of checking sync, photographic quality, camera technique, action, etc. They are printed as 1-light (untimed) prints so that judgments of exposure, color, etc., can be made. Also called *workprints* when assembled or partly assembled into screen continuity. The terms *daily* and *workprint* are interchangeable today, and the daily print is usually ordered as workprint. Also known as *rushes*.

Degauss To demagnetize, or erase the signal on magnetic tape or film. This is most easily done with a bulk eraser, rather than running a tape or film through an erase head on a recorder. Degauss is also term for demagnetizing record/playback heads on tape and film recorders and magnetized cutting tools.

Density The unit of measure for the blackness (opacity) of a photographic image.

Dialog On-camera, lip-sync speech, as contrasted with *narration*, which may occur off camera or as a voice over the picture.

Displacement Recording See Section B-15.

Dissolve An optical effect on the screen between two superimposed shots, in which the second shot gradually begins to appear as the first shot gradually disappears. A dissolve can be thought of as an overlapped fade. Also called a *lap-dissolve*.

Double-Exposure Successive exposures of two or more scenes so that two or more superimposed images are visible on the screen. Sometimes called *super-imposure, super-imp, or super*.

Double-System Recording A method of sound recording in which the sound is

originally recorded on a separate piece of film or tape from that on which the picture is recorded. (See also *Single-System Recording.*)

Dubber A sound-playback unit of high quality, the output of which is mixed in a console with the output of other dubbers and/or microphones and then recorded in a sound recorder. The whole process is known as *re-recording, mixing,* or, sometimes, as *dubbing.*

Dubbing (1) Synchronization with the lip movements of an actor by a voice not originally recorded in sync with the picture. It may or may not be the voice of the original actor, and it may or may not be in the same language. Dubbing is usually accomplished by means of loops, consisting of short sections of picture in composite-print form. The actors are guided by playback when they dub to the picture. (2) Same as *Re-recording.*

Dupe A term for a duplicate picture or sound track.

Edge-Number A series of numbers, combined with key lettering, which are printed at intervals of a foot or less along the edge of most types of raw film stock. These numbers print through the camera-original film to the workprint stock so that these two films can be matched. Same as *footage edge-number* and *negative number.*

Editorial Sync (Edit-Sync) See *Synchronize.*

Effect An optical technique, such as a wipe, split-screen, reduction, enlargement, etc., or a film technique, such as a dissolve, fade, double-exposure. Some effects can be done in a contact printer; others must be done on an optical printer. Also an audio term meaning those real or simulated sounds that would occur in the location portrayed, generally as a result of the action taking place in the film. A *special effect* is something unusual and imaginative.

Electronic Clapstick See *Slate Board* and *Beep Tone.*

Emulsion Before exposure and processing, the emulsion is a light-sensitive coating on film; after exposure, it contains the latent (non-visible) image; and after processing, it carries the photographic image. The emulsion is coated on a thin flexible base to allow it to travel through various machines. The emulsion side is recognized by being duller than the base side, by its left to right reversal of the image (on original film, release print), and by the tried and true method of placing the film between wet lips (the side that sticks to one lip is the emulsion side).

Emulsion Position For camera-original film or raw stock, the emulsion side faces the subject to be photographed. When run in a projector, it faces the screen. For a print made from camera-original film (daily, workprint, answer print), the emulsion side faces away from the screen. For a second generation print (release print) made from an internegative or a printing master, the emulsion side faces the screen. This is the correct emulsion position for television and theatrical release. When a print is made from a film, the emulsion position is reversed.

End Sync Marks (Tail Sync) Synchronizing marks placed at the tails of reels of sound and picture film, usually to enable printing to be effected in both directions. Tail sync marks can also be useful in dubbing sound tracks.

Equalization In sound recording, a system of frequency adjustments at the re-record

stage which serves to improve the overall signal-to-noise ratio, to adjust for *presence*, and to reduce breathing and other audibly unpleasant noise.

Extended Scene A scene in the workprint that must be lengthened in matching or conforming it to the original film. Sometimes called a *slug*. For markings, see Section A-6.

Fade An optical effect in which a shot gradually disappears into blackness (*fade-out*) or appears out of blackness (*fade-in*). For markings, see Section A-6.

Fine-Cut The final version of a workprint. The fine-cut follows the rough-cut assembly stage in the film's progress towards completion. At each stage the cutting is refined and unnecessary footage is eliminated.

First Trial Print Same as *Answer Print*.

Flange A disk, usually made of metal or plastic, against which film is wound on a core. (See also *Split Reel*.)

Flash Frame The frame or frames at the tail of a shot that are overexposed because the shutter stays open when the camera stops.

Flutter (Flutter and Wow) An unsmooth movement of tape or magnetic film across a record-playback head, which gives the sound a gargle-like defect. It is most serious when the defect is in the original recording.

Flux The magnetic field or force that surrounds the recording head on a magnetic recorder and is responsible for rearranging the oxide coating of the tape or film into a reproducible (through the playback head and amplifier) sound.

Fogged Number See *Edge-Number*.

Frame The individual picture on a strip of film.

Frame-Line The horizontal line that separates frames of film.

Freeze Frame A single frame of a shot that is treated as a still photo during the printing process so that a length of print stock exposed to this one frame will have a predetermined screen time of this one still frame. For workprint markings, see Section A-6.

Gate A term sometimes applied to the exposure aperture of cameras and projectors, because they often swing outwards on hinges for threading and cleaning.

Head (Sound or Picture) The beginning of a scene or shot as contrasted to the *tail*, which is the end of a scene or shot. Also, the sound-reading (or pickup) head which converts magnetic pulses (flux) from tape or film into electrical energy that becomes audible when amplified. The *recording head* is just the reverse of this procedure.

Heads-up A term applied to a reel of film that is wound so that the first frame to be projected is on the outside of the reel. The opposite term is *tails-out*.

Ink-printed Numbers Same as *Edge-Numbers*, but printed on the camera-original film and the workprint, in-sync, in the laboratory.

Inserts (Insert Shot) A film shot, usually a close-up or extreme close-up, that is inserted into a scene or between scenes to better explain the meaning of that scene. Sometimes referred to as a *cutaway.* Also, the act of cutting in a shot.

Intercutting Cutting from one angle to another and back again (reverse angle) or from one type of shot to another (medium to close, etc.), all within the framework of the master scene.

Interlock System Coordinated electrical motors that start, run, and stop at precisely the same time and speed. AC, DC, and Selsyn interlock systems are available. Selsyn is a made word, derived from the words "self-synchronous." The term *interlock* is sometimes also applied to any system by which picture and sound tracks may be projected synchronously, or to the achievement of synchronism by the use of sync motors or mechanical coupling.

Intermittent Action (Movement) The "stop and go" action of motion picture film at the aperture. The film is brought to a dead stop and exposed in the gate of the camera or projected in the projector. The shutter then interrupts the light, the next frame is moved down to a dead stop, and so on.

Internegative A negative that is printed directly from a color-reversal original film. A black and white negative from color or black and white original film is called a *release negative*, a *fine grain*, etc. The purpose of an internegative or release negative is to take advantage of the lower cost and higher quality of the negative/positive printing process. (See Part A, Introduction.)

Key Number See *Edge-Number.*

Lap-Dissolve Same as *Dissolve.*

Latent-Image Key Numbers See *Edge-Number.*

Light Table (Light Box) A table that is glassed over and illuminated from beneath, allowing the film image and edge-numbers to be read, while the film is in the synchronizer. The light table is also useful in judging dissolves and double-exposures.

Lip-Flap Same as *Silent Lip.*

Lip-Sync The most critical type of synchronism. It refers to, but is not limited to, the synchronizing of lip movements to words. Most filmmakers can spot an out of lip-sync shot by 1 or 2 frames; the industry standards are 1 frame plus or minus in 360 feet.

Live Recording Recording the actual sounds in the physical world, as contrasted with re-recording. Also called *original* or *source recording.*

Loop (1) A slack section of film designed to provide "give" when film is being fed from a continuously moving to an intermittently moving sprocket, or vice versa. Example: the loops above and below the aperture gate of a camera or projector. (2) A continuous strip of film or sound track that passes through a projector or sound reproducer in order to repeat a piece of action or sound over and over again. Loops are used for instructional purposes, as guide tracks in dubbing, and as convenient vehicles for continuous sound effects in re-recording.

Loop Tree A system of film rollers so arranged as to support and not retard the free movement of a film loop (picture or sound) through the mechanism of a projector or sound dubber. Also used in printing.

Magnetic Film (Magnetic Sound Film) 16mm, 17½mm, or 35mm perforated film coated with iron oxide. Used to make original recordings or to re-record or transfer sound from other audio media. The perforations in any one size match the perforation for picture film, so that the two can be cut to match on a synchronizer.

Magnetic Sound Stripe Magnetic sound striping is a process by which a magnetic (iron oxide) coating is applied to the base side of the sound track edge of a film or of raw stock. The striping varies in width from 100 mils (.1 of an inch), occupying the entire sound track area, down to 25 mils (.025 of an inch), which can be coated adjacent to an existing optical track. To insure that the film will lie flat and run through the gate of a camera or projector properly, a balance stripe is applied to the opposite edge of the film stock. When sound striping is applied to raw stock by the film manufacturer, it is possible to make single-system sound-on-film recordings in cameras so equipped. Striping is often used to make foreign language versions for existing films, and it can be applied to edited film for experimental sound mixes. (See Section B-8.)

Master Shot (Scene) A single shot of an entire piece of scene action which is taken in order to guide the assembly of the component detail shots which provide pacing and rhythm in the completed sequence. Sometimes called an *orientation shot.*

Mixing A term for *re-recording.* Mixing is generally used to denote the final re-recording to prepare a master sound roll for printing. Also called *sound mixing.*

Modulation The act of impressing a sound wave or audio signal onto a medium, such as tape, film, or a record. When a recording is said to be modulated, it means that a signal is present. A modulator is the device (light valve) in an optical recorder that responds to differing electrical energies (produced from sound waves) to produce the variable density or variable area sound tracks. The reverse happens in the projector to change differing light values into sound.

Moviola The Moviola editing machine is a film viewer and/or sound reader that can be interlocked to read double-system sound and film. It will also read single-system sound on film, optically and magnetically. The company manufactures a number of combinations, from a single picture head to a composite picture head and up to as many sound heads as you could want. The Moviola machine is a versatile, time-saving editorial tool. It affords a means of previewing dailies for synchronizing them; of making editorial decisions as to content, pacing, timing, etc.; and of choosing a constant 24 frames per second or variable frame speeds for viewing and listening.

One-Light Printing See *Dailies.*

Optical Effect Modifications of the images on the camera-original footage, usually produced in an optical printer. See also *Fade, Dissolve, Double-exposure, Wipe.*

Optical Master A printing master film (one that is used to make many release prints) made by means of an optical printer.

Optical Track (Optical Sound Film) As differentiated from magnetic sound track, the optical track is produced photographically and appears as an image on the sound-band area of the sound film. (See also *Sound Track.*) .

Original Film (Negative) The film used to photograph the scene. Since each film process causes some modification or degradation of the scenes, the condition of the original film is of great importance in setting up standards of comparison. It represents, in a few thousand feet of film, the entire cost of production. Also called *camera-original film.*

Outs Rejected shots (or takes of a shot) which do not find a place in the completed version of the film. Also called *out-takes* or *trims.*

Oxide The coating on magnetic tape and film which carries in suspension the iron particles that form the audio signal. It is roughly analogous to the emulsion on a photographic film.

Parallel Sync Same as *Edit-Sync.* (See also *Synchronize.*)

Pilot Print Same as *Answer Print.*

Post-Synchronization The addition of speech or sound effects to sync with picture images that have already been shot. (See also *Dubbing* (1).)

Pot, Potting A term used to indicate the volume control on an amplifier or recorder. Also, the act of using the control or changing sound levels, such as "pot-up" and "pot-down," or "this scene will take a lot of potting" (a lot of sound-level changes).

Prescoring Recording of music or other sound prior to the shooting of the picture that is to sync with it. This technique is almost always used in the making of animated films.

Presence (1) A quality that makes a sound (voice, music, effects, etc.) seem to be actually present in the room (or theater) with the listener. This is achieved by bringing forward (equalizing or boosting) the mid to high range (2–8 KHz) of the sound. (2) A colloquial term meaning the ambient sound that a room or a place establishes.

Printer Sync Same as *Projection Sync.* (See also *Synchronize* (3).)

Printing Master A reversal master print in 16mm made specifically to produce other prints with the correct emulsion position for release. The printing master is a first generation dupe of the camera-original film. Consult with your lab for advice on the best way to obtain multiple prints from your original.

Projection Sync Same as *printer sync.* (See also *Synchronize* (4).)

Rack A crossarm assembly, with clips to hold film pieces, usually mounted above a film bin.

Raw Stock Motion picture film that has not been exposed or processed.

Reel (of Film) The standard unit of film measurement: the amount of film which will project for 10 minutes (i.e., 900 feet of 35mm and 360 feet of 16mm film). Standard

reels are designed to hold these lengths of film but will actually accommodate up to 1,000 feet of 35mm and 400 feet of 16mm film.

Release Print A final composite print made from scene-timed, color-corrected, original rolls and sound track. If for release in theaters and on television, it is printed from first generation dupe, or an internegative, to place the emulsion position forward (toward the screen).

Report Sheet Same as *Camera Log.*

Re-recording Re-recording is the electronic process of transferring sound records from one recorded medium (tapes, disks, films) to another medium (tape, films, etc.). Re-recording may also be used to combine different sound tracks into a single record (it is then termed *mixing* or *sound mixing*), to adjust the response frequency characteristic, or to adjust the relative sound levels between different scenes or sequences.

Resolve The process of transferring the sound signal from ¼-inch tape (recorded by the pulse system) to a sprocketed film recorder (magnetic or optical) so that the resulting sound is in sync with the picture. The sync-signal on the ¼-inch tape is picked up and amplified and used to adjust the speed of the playback or recorder motor.

Room Tone (1) An audio term that refers to sound that characterizes the size and shape of a room or location. The sound recordist adjusts the sensitivity of the microphone or recording amplifier to obtain the best (flattest) recording. (2) A term meaning the ambient sound generated by a room or location. Also called *presence.*

Rough-Cut The version of the workprint that follows after the rough assembly in the film's progress toward completion. There may be several rough cuts before a fine cut is achieved.

Run-up The footage which has to pass through a film mechanism before the mechanism gets up to full operating speed. Generally about 2–5 feet for interlocked dubbers, recorders, and projectors in 16mm.

Rushes Same as *Dailies.*

Scene In the film sense, a scene is a piece of the outside world, constructed visually or aurally or both, and then recorded by a picture camera and/or sound recorder. More technically, the term is limited to the one or more takes of a piece of action, usually as outlined in a script.

Screen Continuity The final ordering of all the shots of a film into an arrangement that best tells the story.

Script The written or pictorial "blueprint" for the making of a film. In its early stages, the script is often known as a *treatment*, while the finally revised script is called a *shooting script.*

Segue Short for the Spanish word *seguida* (following, successive), it differs from a sound dissolve (the overlapping of sounds) in that it is an imperceptible change (blend) from one sound to another (usually music, though any sound can be segue'd).

A segue requires two or more sound tracks (or other sound sources), and a balance point or changeover point must be found in both sounds.

Sequence A duration of film which may express a more or less complete idea and usually takes place in one location. Sequences generally begin and end with fades. However, to give better pacing of the action, dissolves or even cuts are frequently used. In a comparison with writing, a sequence may be considered as similar to a chapter.

Shooting Script The final working script, which details the shots one by one in relation to their accompanying dialog or other sound. This script is further broken down into the *shooting schedule*, which outlines the shots to be taken, not by sequence but by location or time schedule.

Shot A single continuous action from camera start to camera stop; the elemental building block in film construction. In commercial practice, a shot is often called a *scene*, especially in referring to the script. Shots are described in terms of what they represent; distance between subject and camera (close-up, medium shot, long shot, etc.), camera angle (point of view, reverse, straight, etc.), and location (interior, exterior, night, day, etc.). In describing the shot distance (shot size), care must be taken in determining the scale of the subject matter; for example, a close-up shot of the wing of a 747 jet aircraft is quite different from a close-up shot of the wing of a gnat, yet they may fill the same screen area. For a form of shorthand to be used in filling out the Cutting Log, and other cutting scripts, see the Direction Symbols chart (Appendix A).

Silent Lip (Lip-Flap) A single-system sound-on-film cutting term applied to the technique of matching the head picture of one scene with the tail picture of another scene. This demands removal of the sound track portion of the head picture scene, which leaves the head picture without its matching sound. The term is derived from the effect, seen on the screen, of lips moving but no sound being heard. This absence of sound lasts about one second. Techniques for cutting single-system sound-on-film are described in Section B-16.

Single-System Recording A method of sound recording in which the sound is originally recorded on the same strip of film as the picture image. This is done on a narrow band along the edge of the raw stock, either magnetically or optically. That matching sound is advanced 26 frames from the matching picture for optical sound and 28 frames for magnetic sound.

Slate Board Also called *number board, production slate,* and *clapboard*, a slate board is an identification board held briefly before the camera and photographed in order to identify the scene and take for the editor. The device used to establish sync between camera and the sound recorder, in double-system sound recording, is called a *clapper board* or *clapper stick*. This however has been largely replaced by a built-in electronic signal which automatically fogs the film and puts an in-sync tone on an unused portion of the sound track. Usually, the last fully fogged frame is sync'd with the head of the tone.

Slug A slug is a piece of film leader inserted in a picture or sound workprint to replace damaged or missing footage or scenes.

Sound Band Same as *Sound Track*

Sound Effects All sound other than the dialog, narration, and music which may be recorded on the sound track of a film. Prior to re-recording, these effects may occupy a separate track.

Sound Reader An editing tool designed to make audible either magnetic or optical sound track. It is used on the editing bench and in line with the rewinds and synchronizer. A sound-reading head can be mounted directly onto the synchronizer or viewer and its signal fed into an amplifier.

Sound Speed A standard *frame rate*, or rate of speed, of the film through a sound camera or projector. In standard 35mm and 16mm practice, this standard frame rate is 24 frames per second; the rate of speed is 90 and 36 feet per minute respectively.

Sound Track A narrow band along one side of the sound film, which carries the sound record. There are several types of sound tracks in use today with 16mm film: (1) *magnetic track;* (2) *variable-area optical track;* (3) *variable-density optical track.* The term is also used to define the separate piece of film used to carry the sound record in double-system editing and recording. Separate magnetic tracks have two standard sound band positions: edge track and center track. However, both are reproduced optically onto the edge of the final composite print.

Special Effects A term for effects that are produced outside the normal sphere of live-action production. Special effects may include forms of matting, split screens, animation combined with live action, models, and combination foregrounds and backgrounds.

Splicer A device that holds two pieces of film or tape in registration so that they can be joined by cement, pressure-sensitive tape, or a heated ribbon.

Splicing Block A simple inexpensive device, with a channel to hold film straight, pins to register film pieces, and a straight and diagonal cutting guide for cutting film. This cutting tool is great for repairing torn sprocket holes and film and for splicing magnetic film.

Split Reels Standard reels with one removable side so that a core may be mounted on the spindle and wound film removed at will without unwinding.

Spotting The process whereby the location of individual words or modulations on a sound track can be accurately determined. This is accomplished on a sound reader or Moviola.

Start Mark (Printer Start Mark) A sync mark or punch mark on the head of a roll of film and sound track designating the point from which an operation such as printing, projection, or synchronizing is to begin. It is generally understood that this mark is 0 footage and all notes to the lab regarding the footage/frame measurements of effects should state this point as the start of measurement.

Stock (1) Camera stock or raw stock: unexposed, unprocessed camera-original film. (2) Print stock: unexposed, unprocessed stock (usually positive) upon which prints are made. (3) Stock footage, stock shots: library footage of various commonplace scenes, which can be purchased or rented by the foot. See your lab about library footage.

Striped Workprint See *Magnetic Sound Stripe.*

Stripe Print See *Magnetic Sound Stripe.*

Super-Imposition (Super-Imp) Same as *Double-Exposure.*

Sync Beeps (1) Commercially, a product sold under this brand name. They are lengths of ¼-inch magnetic tape coated with pressure-sensitive adhesive and a pre-recorded 1,000 Hz (cycle) tone. Also called *sync pops.* (2) A single frame of 16mm magnetic film, pre-recorded with a 1,000 Hz tone, or any sharp sound, cut into the sound track or tracks (usually 80 frames ahead of the first sound) and its corresponding frame (in edit-sync) marked on the workprint. These are used to carry over an audible sync point during the re-recording process.

Synchronize (Edit-Sync, Printer-Sync, Projection-Sync) (1) To make the sound correspond to the picture in double-system cutting. (2) To sync two cameras or one or more dubbers or projectors; to interlock. (3) *Edit-Sync* (*editorial sync, level sync, parallel sync, dead sync*)—when picture and corresponding sound frames are opposite each other on the synchronizer. One method of preparing printing leader for printing the original rolls and sound track. (4) *Printer Sync* (*projection sync, camera sync* when used in single-system)—when the sound track is advanced 26 frames for optical sound, or 28 frames for magnetic sound, from the corresponding picture frame. The second method of preparing printing leaders for printing original rolls and track. Check with your lab to ascertain which method they prefer—edit-sync or printer-sync.

Synchronizer A device used on the cutting bench for maintaining sync between picture film and sound tracks and for counting feet and frames. It consists of two or more sprocket wheels (*gangs*) rigidly mounted on a revolving shaft. The tracks are placed on the sprockets and accurately positioned by their perforations so that they can be rolled along (forward or reverse) by rewinds while maintaining proper sync. (See Section A-2.)

Synchronous Motor A motor whose speed is regulated so that, when it is placed on a camera, it will power that camera at precisely 24 frames per second. Any camera, equipped with a synchronous motor, will run in sync with any other camera equally equipped, providing they are regulated by the same 60 Hz current. Dubbers and projectors so equipped can run in sync, and when interlocked (see *interlock*) will start and stop on the same frame.

Synchronous Sound That sound which is in exact sound/action relationship with the picture. (See also *Lip-sync.*)

Synchronous Speed See *Sound Speed.*

Tail The end of a scene or shot (or entire film) as contrasted with the *Head*, which is the beginning of the scene or shot. In the Hollywood industry, the tail is referred to as the *foot.*

Take The repeated performance of the same piece of action in front of a camera or recorder. The successive takes are usually numbered from 1 upward and recorded by photographing a numbered slate board.

Timed Print A print made from camera-original film, or other dupes, that has been timed, with each scene's density computed and adjusted to reach an average

(throughout the film) scene density and color. This timing information is recorded on IBM cards or magnetic tape and is used to control the number of printing lights used to print any one scene. The change is automatic and is initiated by a timing cue mark, a punch in the side of the film or a metal tape pasted on the edge of the film.

Title Any written material which appears in the film and is not a part of an original scene is called a title.

Tone Same as *Beep Tone.* Also an audio term meaning color of sound—treble or base, high frequency or low frequency, light or dark.

Track Same as *Sound Track.*

Transfer See *Re-recording* and *Resolve.*

Transition (Bridge Shot) Those shots, usually planned in the script stage, that provide an organic relationship between two scenes. Similar to a bridge movement used in music.

Trial Print (First Trial Composite Print) Same as *Answer Print.*

Trims The unwanted portions of scenes, cut out during the workprint editing stage—hence the phrase *cut and trim.* Trims should be saved; they might prove to be useful later.

Unmodulated (Umod) As in unmodulated sound track, no signal is present on film, tape, or record.

Visuals The picture images of which film is composed. The term is used in technical discussions to direct attention to the picture as contrasted with the sound elements of the film.

Wild Recording (Wild Sound) Any recording that is not made synchronously with a picture record. Sound effects and random voices are usually recorded wild, narration and music sometimes so. Also called *non-sync.*

Wipe An optical effect between two succeeding shots on the screen, in which the second shot appears and wipes the first off the screen along a visible line that may run from top to bottom or side to side or in any one of a large number of patterns. Check with your lab regarding this effect.

Workprint, Picture A picture workprint (*daily print*) is a positive or reversal print which consists of a frame-to-frame copy of the camera-original film. A workprint picture is used to edit and combine the various picture scenes of a film into the desired form. Later on, a workprint may contain intercut sync'd sound dailies, optical effects, etc.

Workprint, Sound (Worktrack) Same as above, but consisting of the various sound tracks.

Wow A slow start or stop in audio recording, producing a "whine-up" or a "whine-down" sound. A wow is also caused by an uneven movement past the record of the playback head of a recorder or dubber. (See also *Flutter.*)

Zero-Cut Printing A method of cutting original film into A&B rolls, in which the original films overlap on each cut. For a complete description of this printing process, see Section A-10.

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